

**FCC 47 CFR PART 15 SUBPART C &
INDUSTRY CANADA RSS-247**

TEST REPORT

For

Wi-Fi (11a/b/g/n 2Tx2R)+BT (V4.1LE) USB Combo Module

Model:

WCBN4515R, WCBN4515R(Ext), WCBN4515R(Emb)

Trade Name: LITE-ON

Issued to

Lite-On Technology Corp.

**Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan,
R.O.C**

Issued by

Compliance Certification Services Inc.

**No.11, Wugong 6th Rd., Wugu Dist.,
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Issued Date: November 17, 2016



**Testing Laboratory
1309**

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 17, 2016	Initial Issue	ALL	Doris Chu
01	December 10, 2016	1. Add remark for Part 15.203 2. Delete mode 2 : PIFA Antenna	P.5, P.9	Doris Chu

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1. TEST RESULT CERTIFICATION

Applicant: Lite-On Technology Corp.
Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585,
Taiwan, R.O.C

Manufacturer: LITE-ON TECHNOLOGY (Changzhou) CO., LTD
A9 Building, No.88 Yanghu Road, Wujin Hi-Tech Industrial
Development Zone, Changzhou City,
Jiangsu Province 213100 China

Equipment Under Test: Wi-Fi (11a/b/g/n 2Tx2R)+BT (V4.1LE) USB Combo Module

Model Number: WCBN4515R, WCBN4515R(Ext), WCBN4515R(Emb)

Trade Name: LITE-ON

Date of Test: September 7 ~ November 16, 2016

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C Industry Canada RSS-247 Issue 1	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247 and Industry Canada RSS-247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Dennis Li
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Wi-Fi (11a/b/g/n 2Tx2R)+BT (V4.1LE) USB Combo Module			
Model Number	WCBN4515R, WCBN4515R(Ext), WCBN4515R(Emb)			
Trade Name	LITE-ON			
Model Discrepancy	WCBN4515R : PCB Antenna WCBN4515R(Ext) : WiFi PCB Antenna, BT PIFA Antenna WCBN4515R(Emb) : PCB Antenna			
Received Date	September 5, 2016			
Power supply	Power form host device.			
Frequency Range	2412 ~ 2462 MHz			
Transmit Power	Mode	Frequency Range	Output Power (dBm)	Output Power (W)
	IEEE 802.11b	2412 - 2462	20.32	0.1076
	IEEE 802.11g	2412 - 2462	24.12	0.2582
	IEEE 802.11n HT 20 MHz	2412 - 2462	27.78	0.5998
	IEEE 802.11n HT 40 MHz	2422 - 2452	27.21	0.5260
Number of Channels	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n HT 20 MHz mode: 11 Channels IEEE 802.11n HT 40 MHz mode: 7 Channels			
Antenna Specification	PCB Antenna Ant1: Gain: 3.41dBi Ant2: Gain: 2.18dBi			
Product SW/HW version	3.3.0 / V00			
Radio SW version	3.3.0			
Radio HW version	V00			

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **PPQ-WCBN4515R** & ISED No. : **4491A-WCBN4515R** filing to comply with FCC Part 15C, Section 15.207, 15.209 and IC RSS-247 & RSS-GEN.
3. Antenna was meets the rule of Part 15.203 Antenna requirement.

Antenna Category	<input checked="" type="checkbox"/> Integral: antenna permanently attached <input type="checkbox"/> External dedicated antennas <input type="checkbox"/> External Unique antenna connector
-------------------------	--

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.207, 15.209, 15.247, KDB 558074 D01 DTS Meas Guidance v03r05. IC RSS-247 and IC RSS-Gen.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.3 DESCRIPTION OF TEST MODES

The EUT (model: WCBN4515R) had been tested under operating condition.

The EUT is a 2x2 configuration spatial MIMO (2Tx & 2Rx) without beam forming function that operate in double TX chains and double RX chains. The 2x2 configuration is implemented with two outside TX & RX chains (Chain 0 and 1).

Software used to control the EUT for staying in continuous transmitting and receiving mode was programmed.

After verification, all tests carried out are with the worst-case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode.

IEEE 802.11b mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE 802.11g mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11n HT 20 MHz mode:

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

IEEE 802.11n HT 40 MHz mode:

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.

3.3.1 The worst mode of measurement

AC Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: Printed Antenna (EUT via USB link NB)
Worst Mode	<input type="checkbox"/> Mode 1 <input checked="" type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark: The worst mode was record in this test report.

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: Printed Antenna (EUT via USB link NB)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input checked="" type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. *The worst mode was record in this test report.*
2. *The EUT pre-scanned in three axis ,X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (X-Plane and Horizontal) were recorded in this report.*

3.4 THE WORST CASE POWER SETTING PARAMETER

IEEE 802.11b mode

Channel	Frequency (MHz)	RF power setting in TEST SW
Low	2412	1C
Mid	2437	1C
High	2462	1D

IEEE 802.11g mode

Channel	Frequency (MHz)	RF power setting in TEST SW
Low	2412	1D
Mid	2437	1D
High	2462	1D

IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	RF power setting in TEST SW (Chin 0)	RF power setting in TEST SW (Chin 1)
Low	2412	20	1E
Mid	2437	20	1E
High	2462	20	1E

IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	RF power setting in TEST SW (Chin 0)	RF power setting in TEST SW (Chin 1)
Low	2422	21	1E
Mid	2437	21	1E
High	2452	21	1F

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	07/04/16	07/03/17
Power Meter	Anritsu	MA2411B	917072	07/04/16	07/03/17
Spectrum Analyzer	R&S	FSV 40	101073	08/01/16	07/31/17

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	12/08/15	12/07/16
Loop Ant	COM-POWER	AL-130	121051	02/25/16	02/24/17
Bilog Antenna	Sunol Sciences	JB3	A030105	07/03/16	07/02/17
Pre-Amplifier	EMEC	EM330	60609	06/08/16	06/07/17
Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/02/16	09/01/17
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	EZ-EMC (CCS-3A1RE)				

Conducted Emission Room # B					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
LISN	SCHWARZBECK	NSLK 8127	8127-541	11/23/15	11/22/16
Receiver	R&S	ESCI	101073	08/20/16	08/19/17
Software	CCS-3A1-CE				

Remark:

- Each piece of equipment is scheduled for calibration once a year and Precision Dipole is scheduled for calibration once three years.
- N.C.R. = No Calibration Request.

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2575
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029
- No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045
- No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN,
R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, horn and/or Loop. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.




Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

** No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Notebook PC	ASUS	M5200AE	5BN0AG019631	PD9WM3B2100	N/A	AC I/P: Unshielded, 1.8m with a core DC O/P: Unshielded, 1.8m
2	Notebook PC	IBM	7663 (T61)	L3E9812	N/A	N/A	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

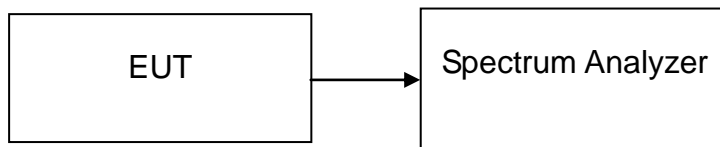
Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

7. FCC PART 15.247 REQUIREMENTS & RSS-247 REQUIREMENTS

7.1 99% BANDWIDTH AND 6 DB BANDWIDTH

Test Configuration



99% BANDWIDTH

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold.

6 dB Bandwidth

According to 15.247 photograph (a)(2) and RSS-247, Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW= 300kHz, Span = 30 MHz, Detector = Peak, Sweep = auto.
4. Set spectrum analyzer as OBW(99%) function.
5. Mark the peak frequency and -6dB (upper and lower) frequency.
6. Repeat until all the rest channels are investigated.

Test Data
IEEE 802.11b mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (kHz)
Low	2412	12.1562	10.0870	>500
Mid	2437	12.1562	10.0870	
High	2462	12.1997	10.0870	

IEEE 802.11g mode

Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (kHz)
Low	2412	16.4544	16.3478	>500
Mid	2437	16.4544	16.3913	
High	2462	16.4544	16.3479	

IEEE 802.11n HT 20 MHz mode / Chain 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (kHz)
Low	2412	17.5832	17.3044	>500
Mid	2437	17.5832	17.1739	
High	2462	17.5832	17.0870	

IEEE 802.11n HT 20 MHz mode / Chain 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (kHz)
Low	2412	17.5397	17.0870	>500
Mid	2437	17.5397	17.0870	
High	2462	17.5397	17.0870	

IEEE 802.11n HT 40 MHz mode / Chain 0

Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (kHz)
Low	2422	35.8900	35.7100	>500
Mid	2437	35.8900	35.5940	
High	2452	35.8900	35.5940	

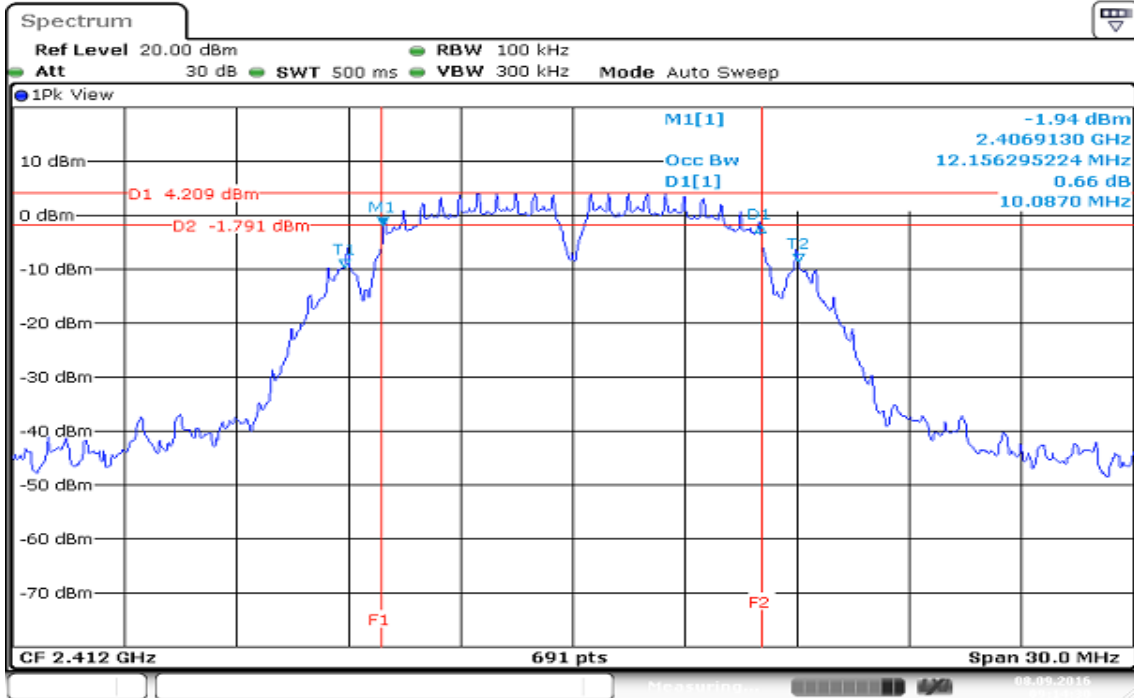
IEEE 802.11n HT 40 MHz mode / Chain 1

Channel	Frequency (MHz)	99% Bandwidth (MHz)	6dB Bandwidth (MHz)	6dB Bandwidth Limit (kHz)
Low	2422	35.7742	35.5940	>500
Mid	2437	36.0057	35.5940	
High	2452	35.7742	35.5940	

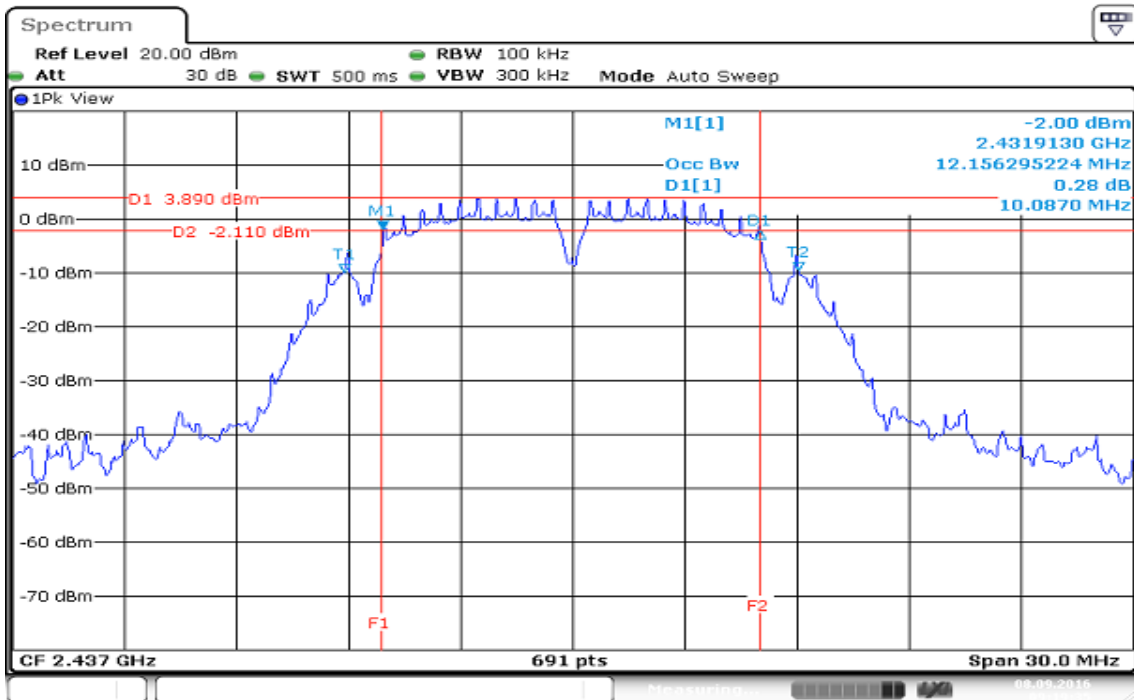
Test Plot

IEEE 802.11b mode

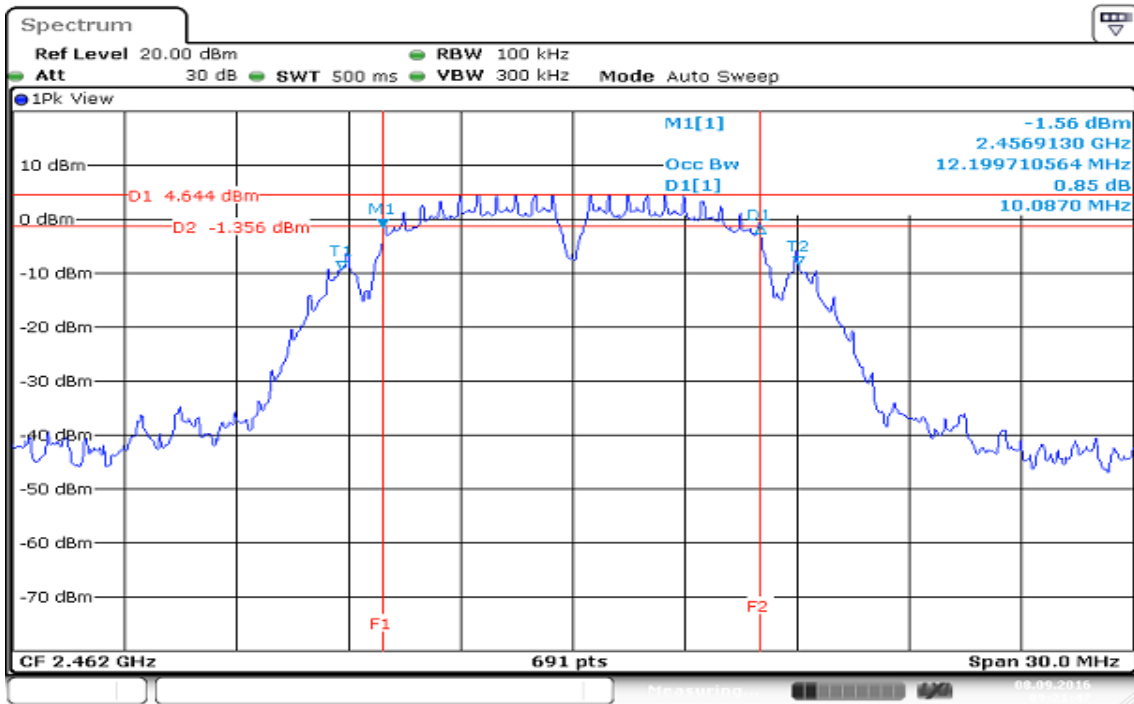
CH Low



CH Mid



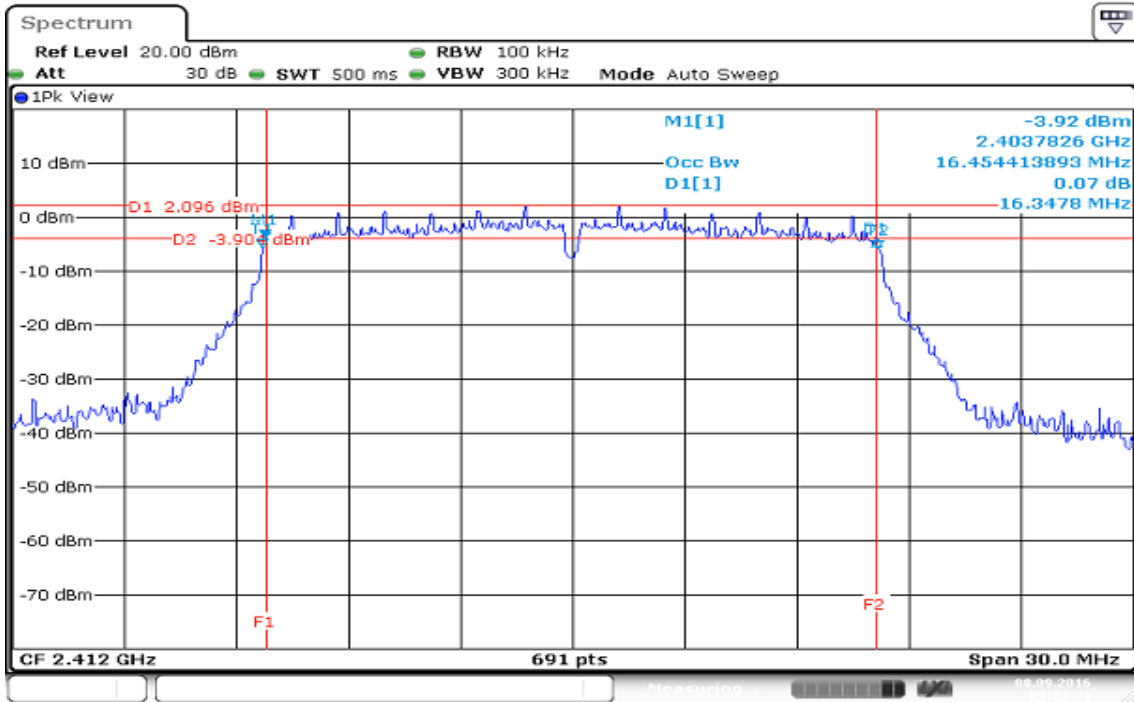
CH High



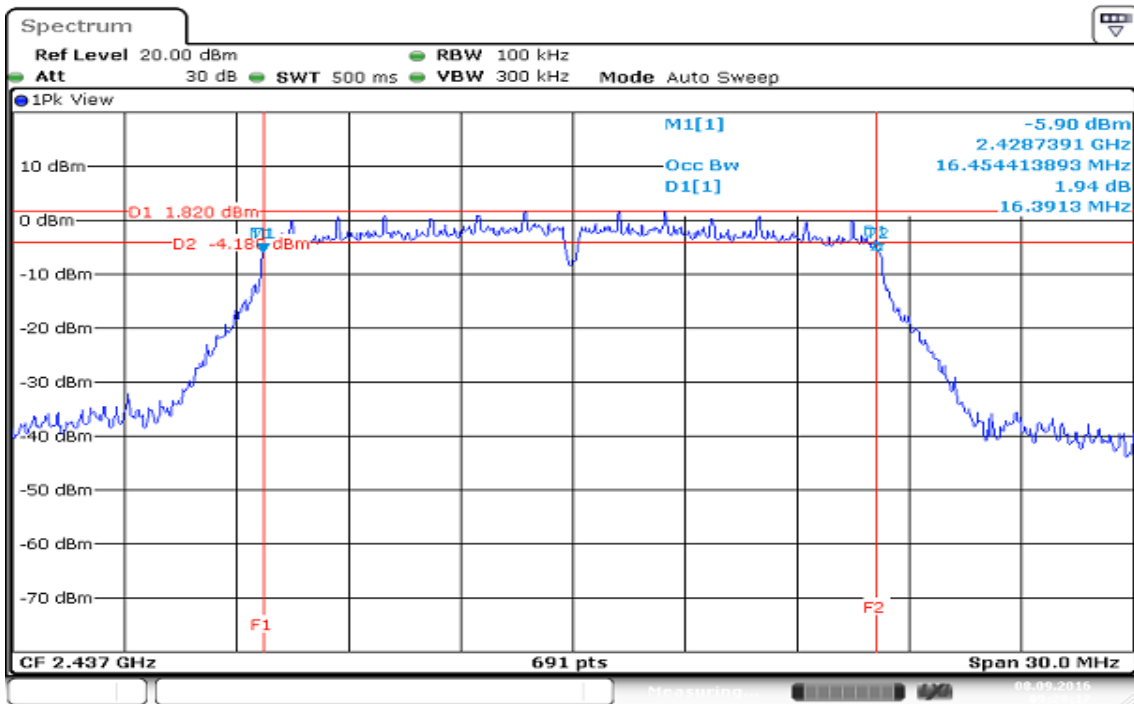
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IEEE 802.11g mode

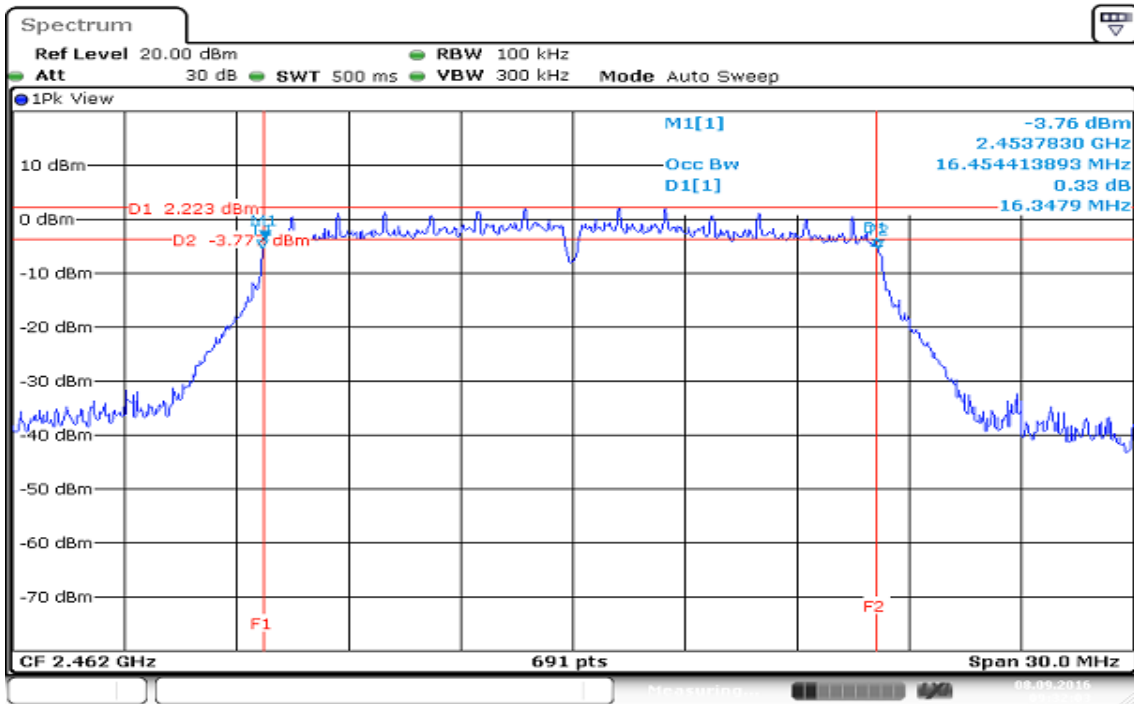
CH Low



CH Mid



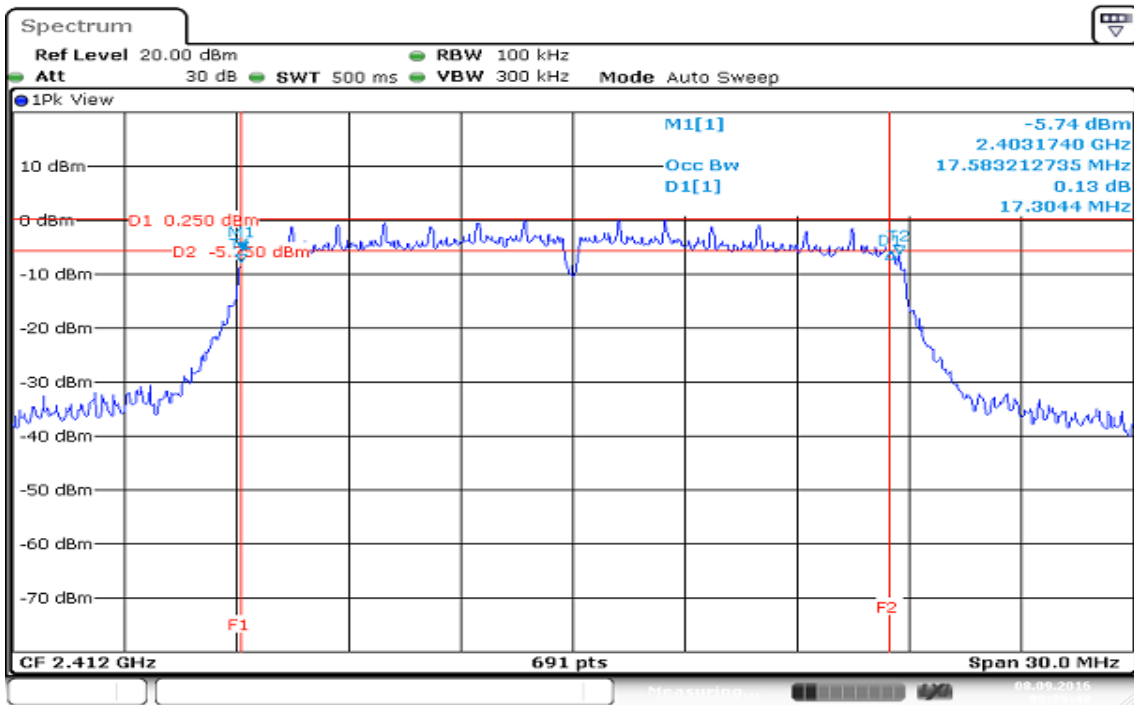
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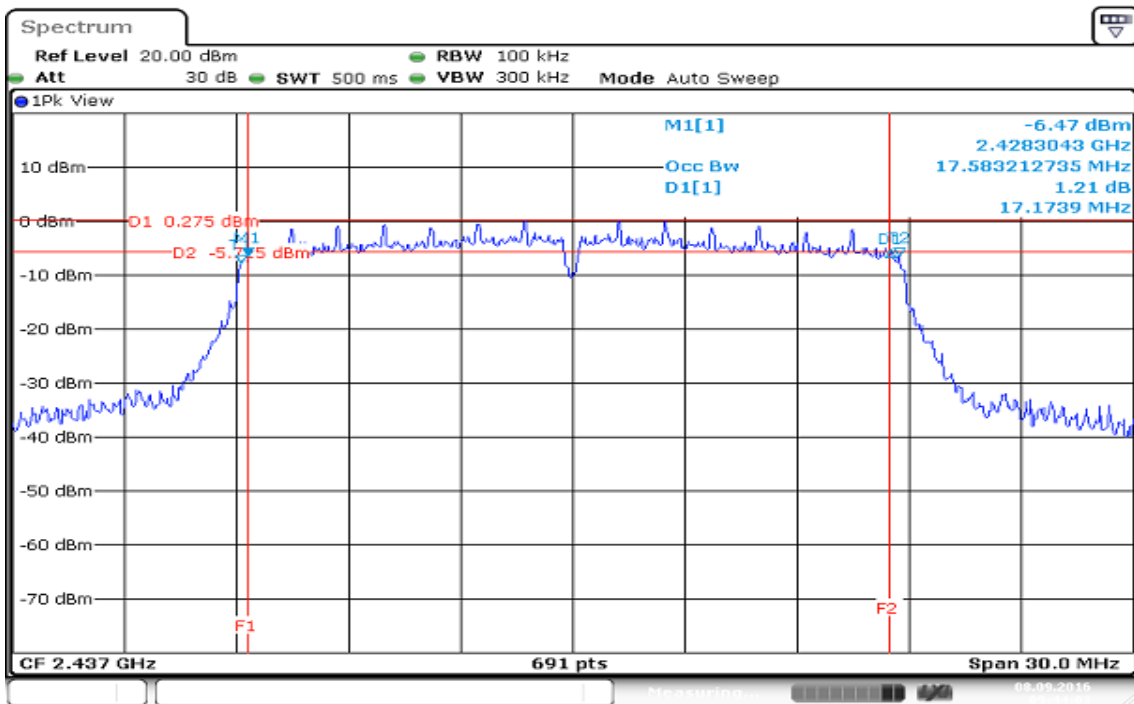
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IEEE 802.11n HT 20 MHz mode/ Chain 0

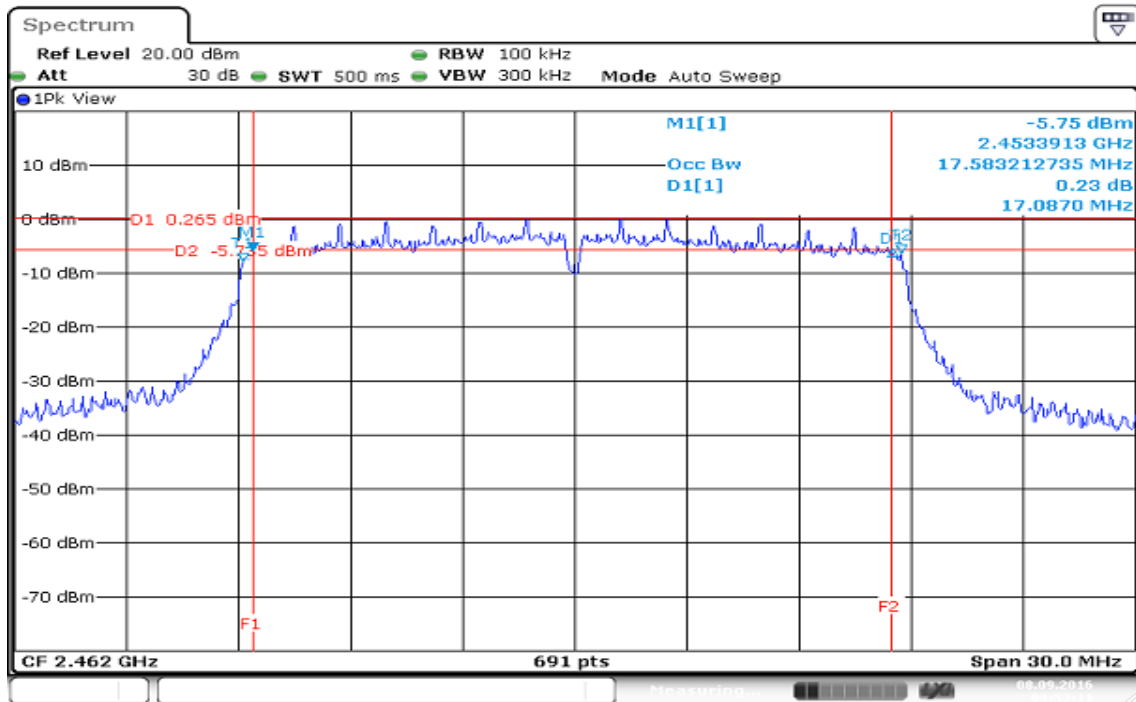
CH Low



CH Mid

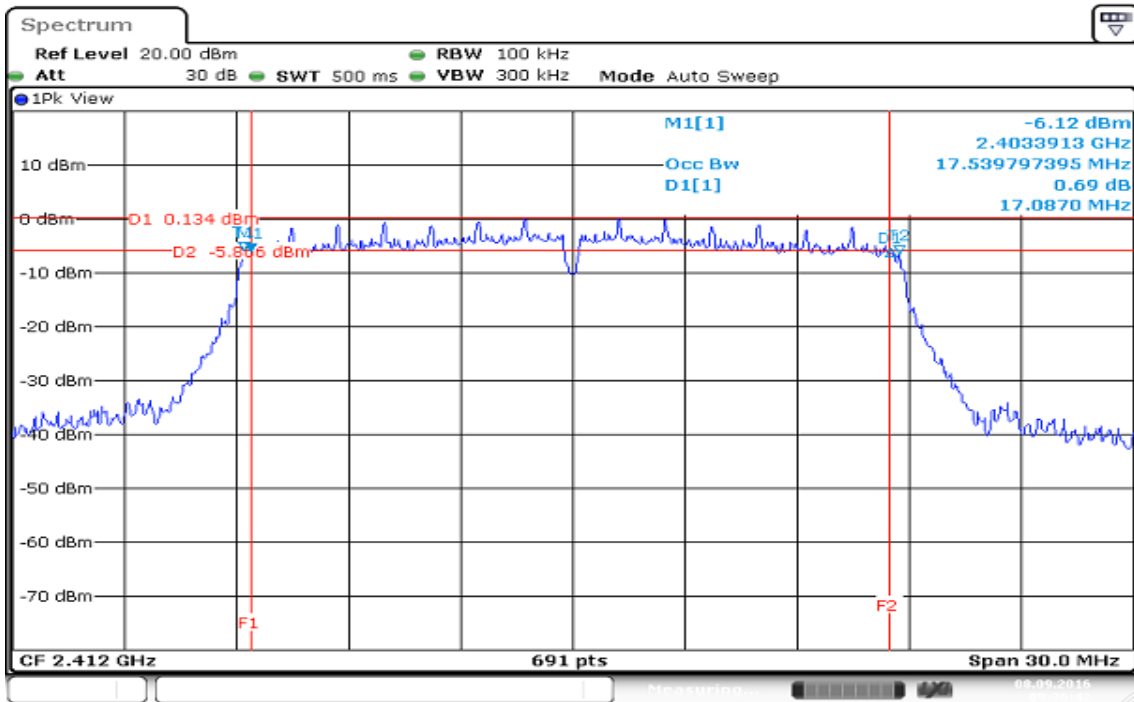


CH High

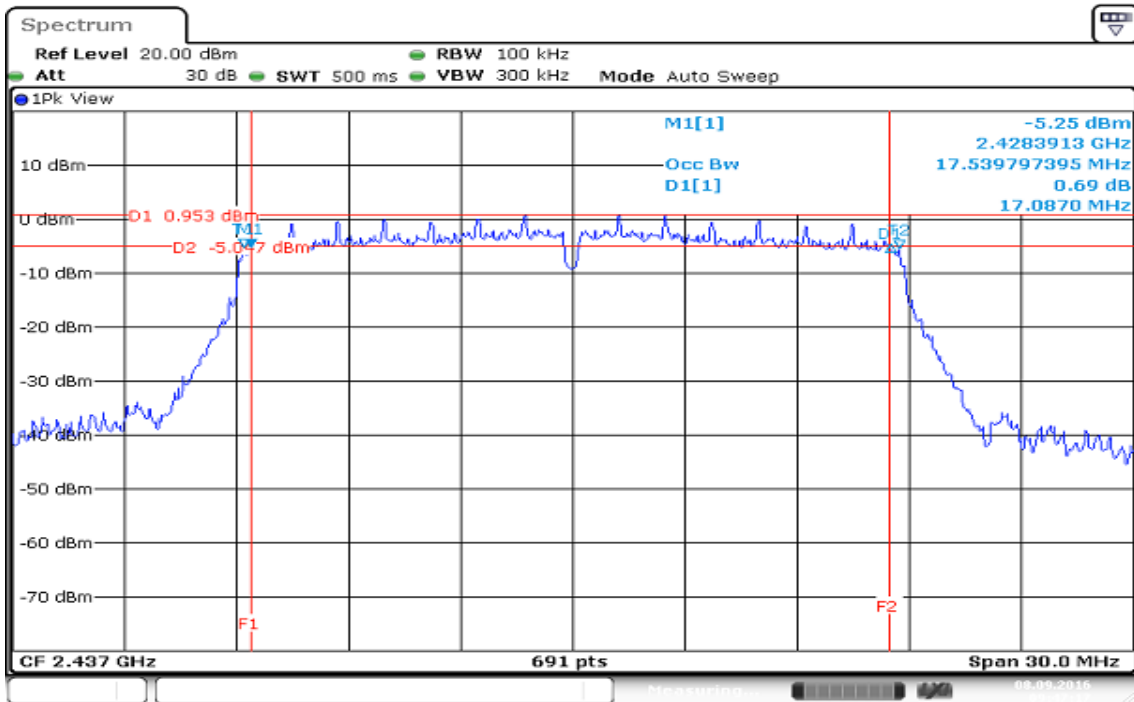


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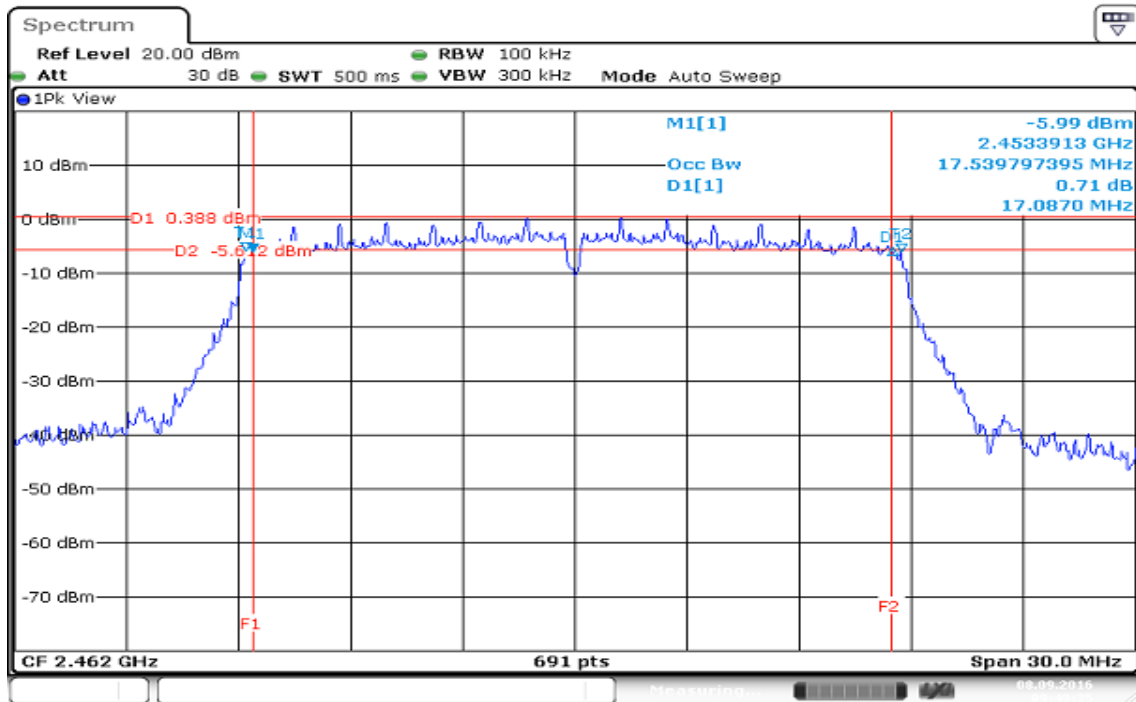
IEEE 802.11n HT 20 MHz mode / Chain 1
CH Low



CH Mid



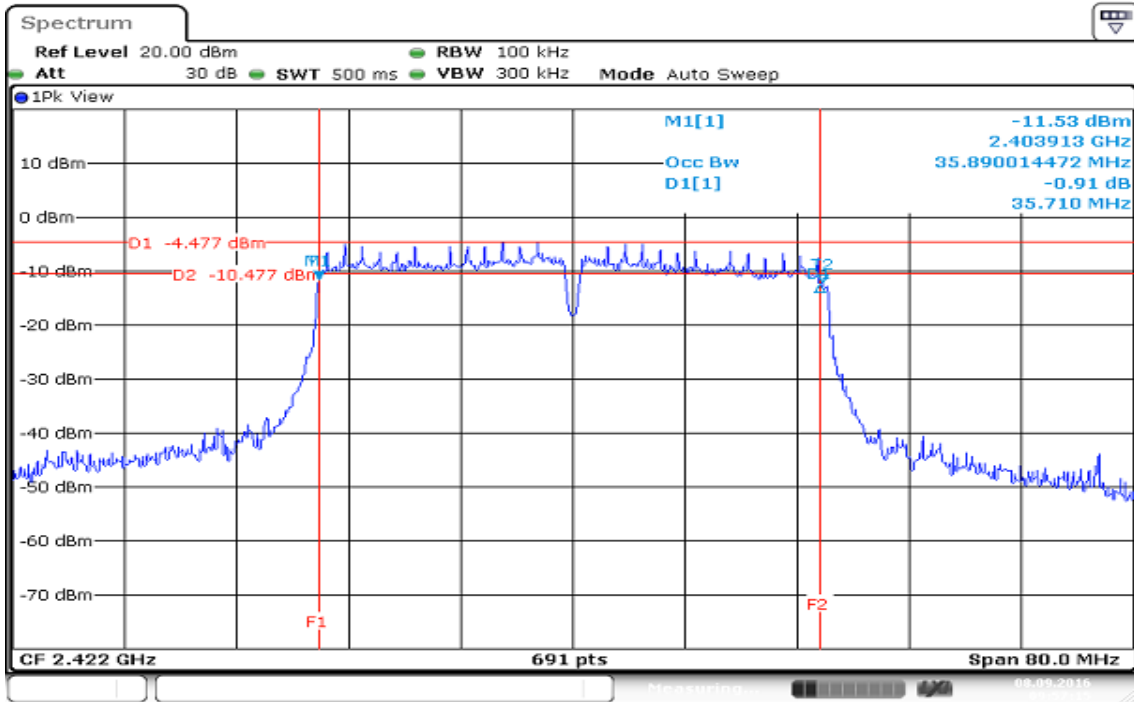
CH High



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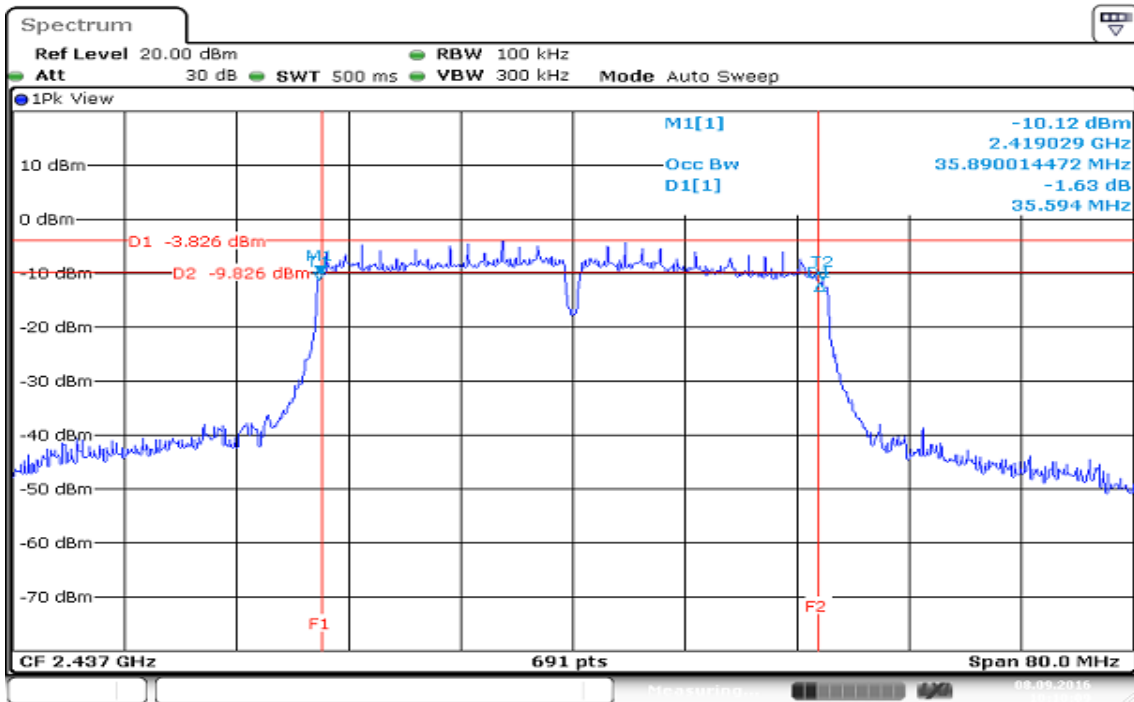
IEEE 802.11n HT 40 MHz mode/ Chain 0

CH Low



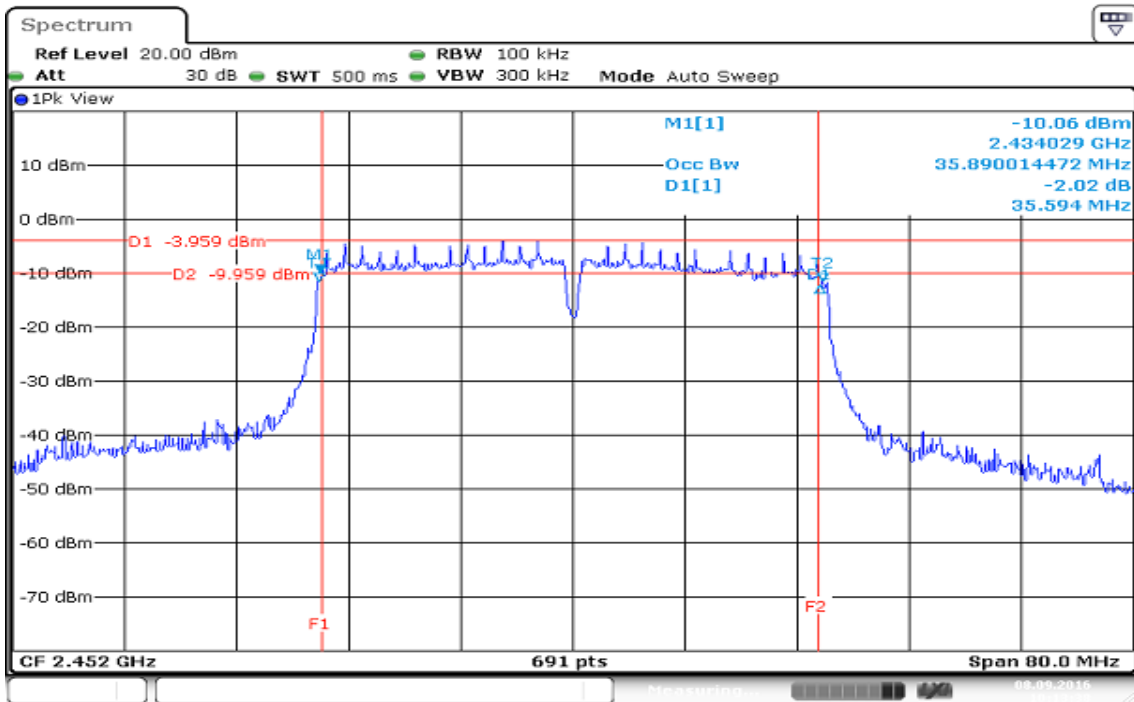
Date: 8.SEP.2016 09:57:16

CH Mid



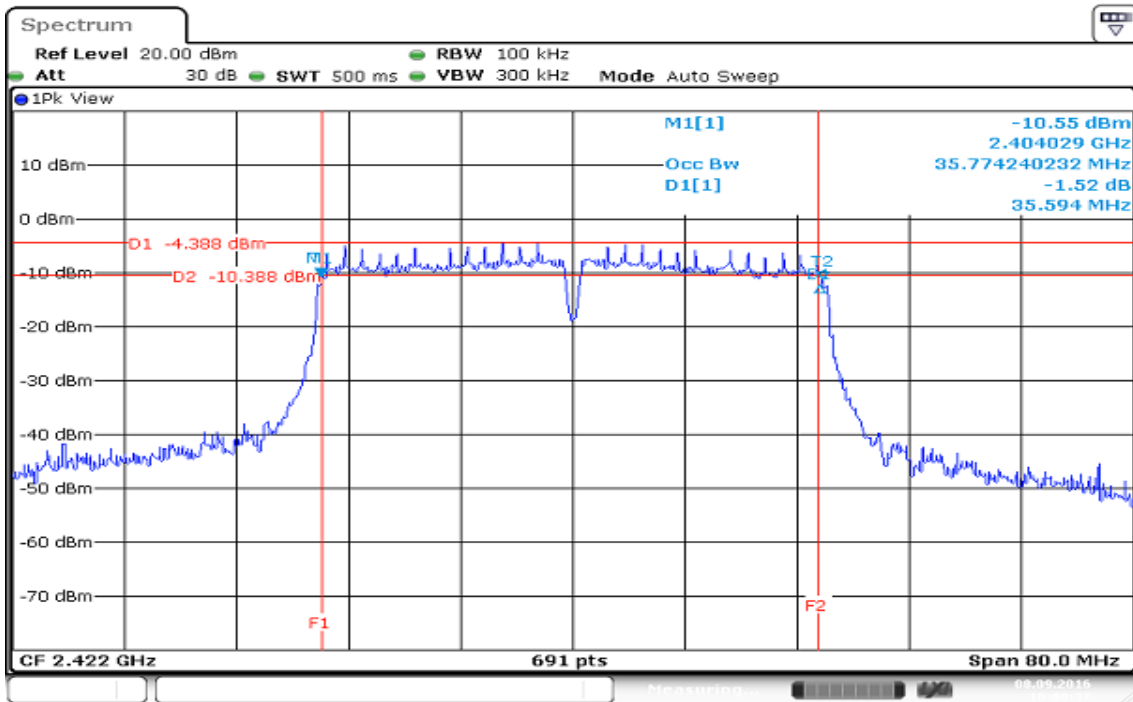
Date: 8.SEP.2016 10:10:09

CH High

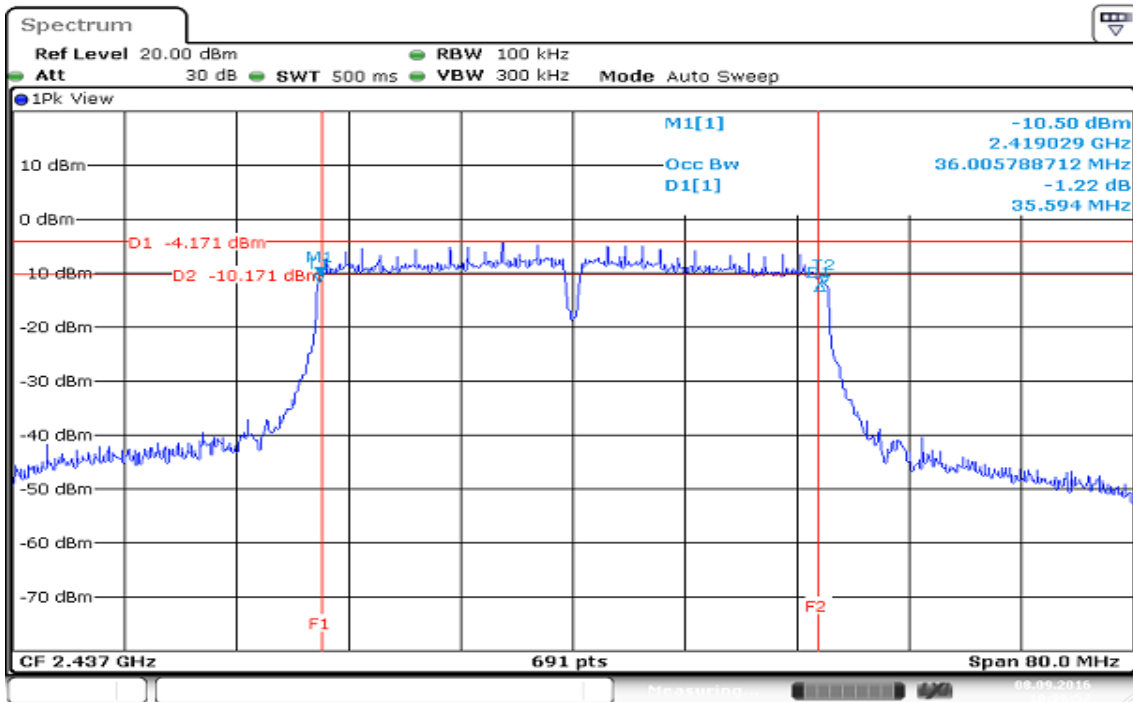


Date: 8 SEP 2016 10:13:28

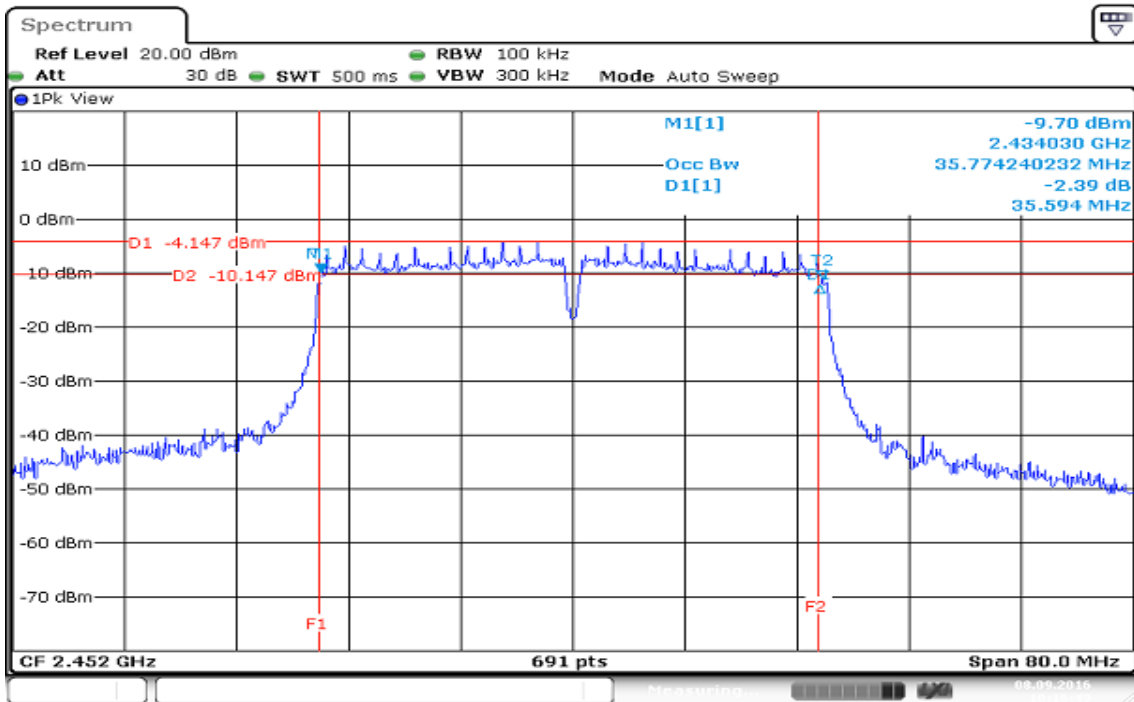
IEEE 802.11n HT 40 MHz mode / Chain 1
CH Low



CH Mid



CH High



Date: 8.SEP.2016 10:16:49

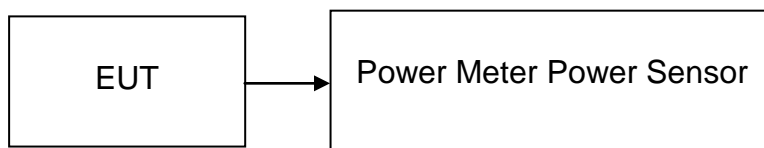
7.2 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. According to RSS-247, for systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (dBm)	Result
Low	2412	20.15	0.1035	30	PASS
Mid	2437	19.87	0.0971		PASS
High	2462	*20.32	0.1076		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (dBm)	Result
Low	2412	*24.12	0.2582	30	PASS
Mid	2437	24.04	0.2535		PASS
High	2462	24.03	0.2529		PASS

IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (dBm)	Result
Low	2412	25.22	24.02	27.67	0.5848	30	PASS
Mid	2437	25.24	24.22	27.77	0.5984		PASS
High	2462	25.16	24.34	*27.78	0.5998		PASS

IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)	Limit (dBm)	Result
Low	2422	24.74	23.19	27.04	0.5058	30	PASS
Mid	2437	24.5	23.02	26.83	0.4819		PASS
High	2452	24.68	23.67	*27.21	0.5260		PASS

Remark:

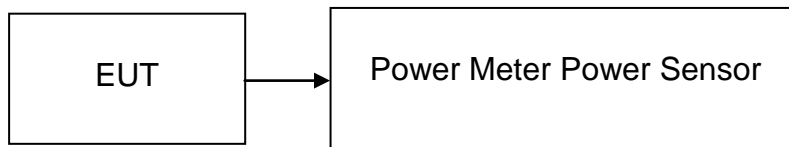
1. Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000)+ Chain 1 (10^(Output Power /10)/1000)

7.3 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	16.95	0.0495
Mid	2437	16.67	0.0465
High	2462	17.01	0.0502

Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	16.21	0.0418
Mid	2437	15.77	0.0378
High	2462	15.83	0.0383

Test mode: IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)
Low	2412	15.75	15.63	19.21	0.0834
Mid	2437	15.86	15.7	19.30	0.0851
High	2462	15.84	15.75	19.32	0.0855

Test mode: IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Total Output Power (dBm)	Output Power (W)
Low	2422	13.87	13.81	17.82	0.0605
Mid	2437	13.72	13.57	17.62	0.0578
High	2452	13.98	13.87	17.90	0.0617

Remark: Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000)

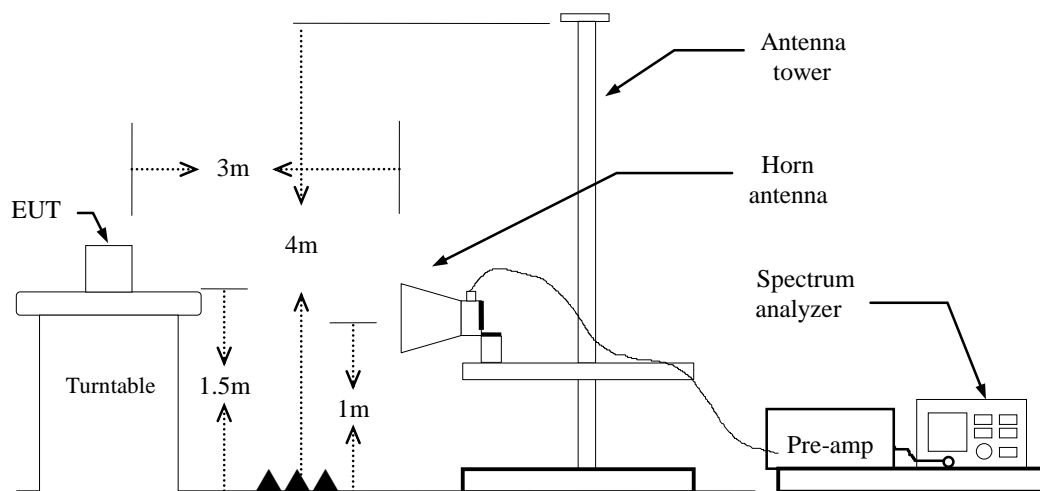
7.4 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d) & RSS-247, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration

For Radiated

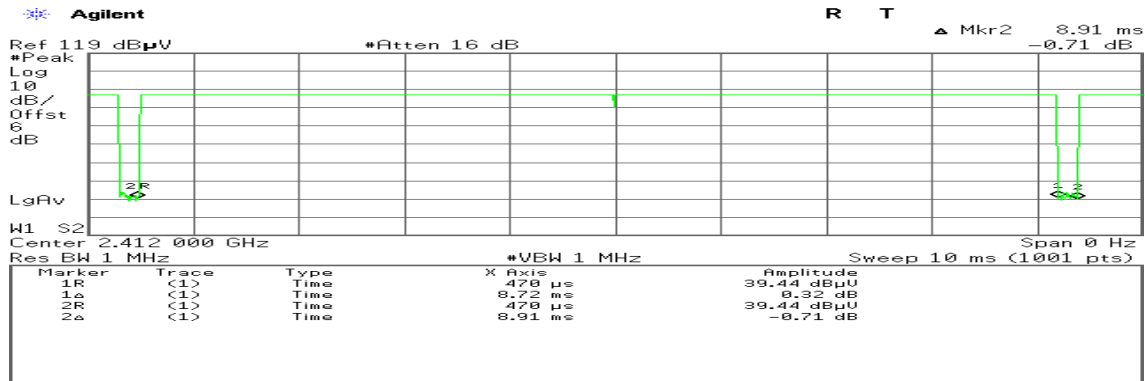


TEST PROCEDURE

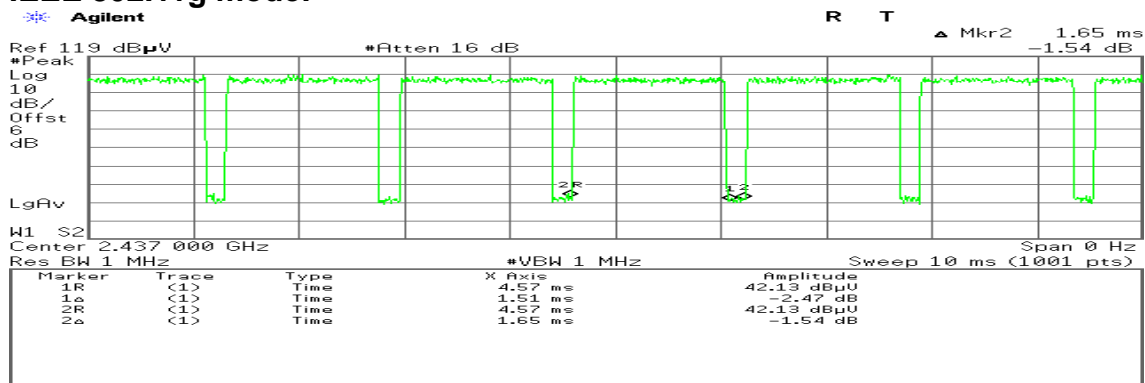
For Radiated

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz,
if duty cycle \geq 98%, VBW=10Hz.
if duty cycle < 98% VBW=1/T.
IEEE 802.11b mode: =98%, VBW=120Hz
IEEE 802.11g mode: =92%, VBW=680Hz
IEEE 802.11n HT 20 MHz mode: =88%, VBW=750Hz
IEEE 802.11n HT 40 MHz mode: =81%, VBW=1.3kHz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.
6. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant

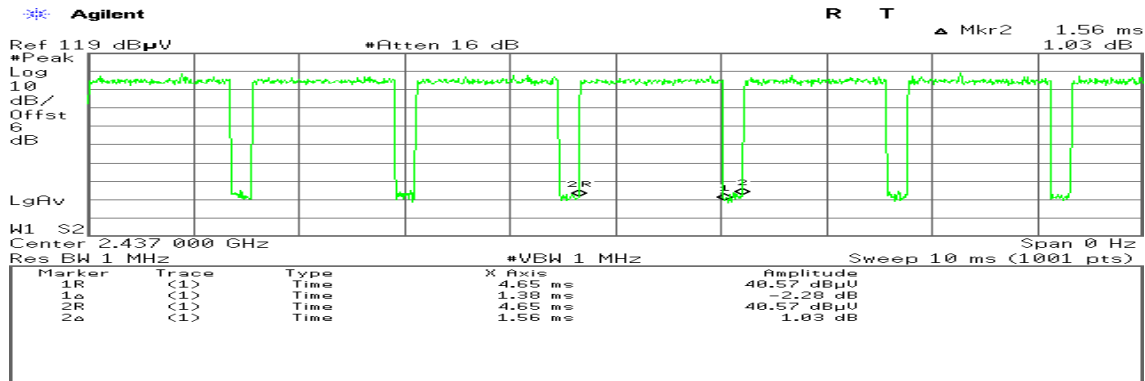
Duty Cycle:
IEEE 802.11b mode:



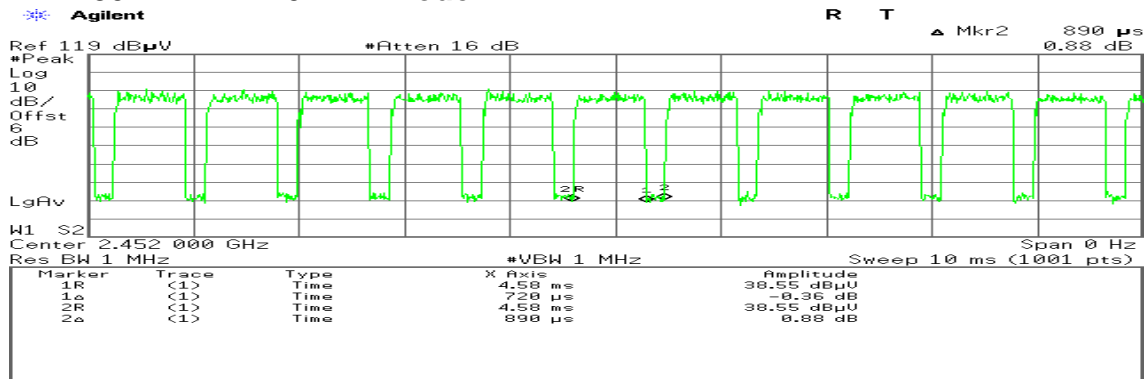
IEEE 802.11g mode:



IEEE 802.11n HT 20 MHz mode:



IEEE 802.11n HT 40 MHz mode:



TEST RESULTS

Refer to attach spectrum analyzer data chart.

Band Edges

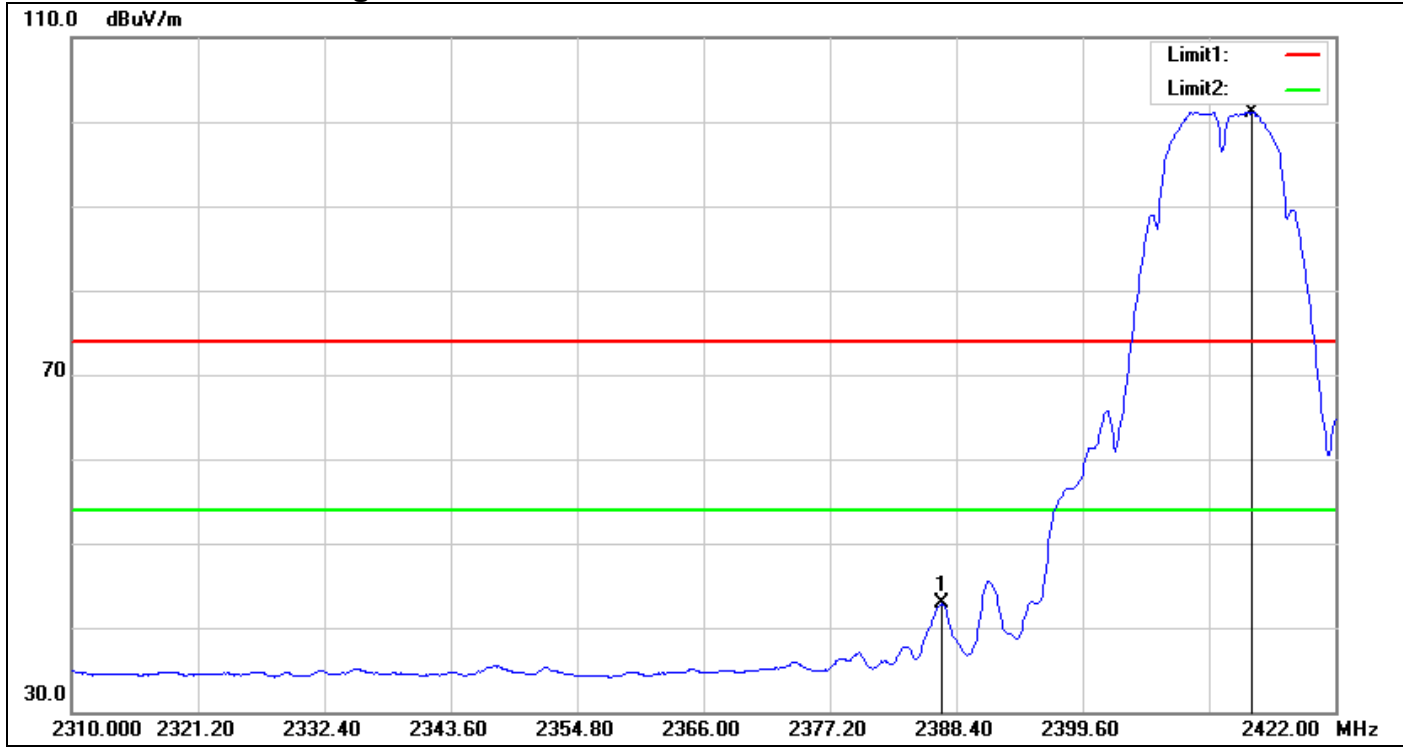
IEEE 802.11b Mode / CH Low

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.408	64.88	-3.28	61.60	74.00	-12.40	peak
2	2413.600	108.89	-3.23	105.66	-	-	peak

Detector mode: Average

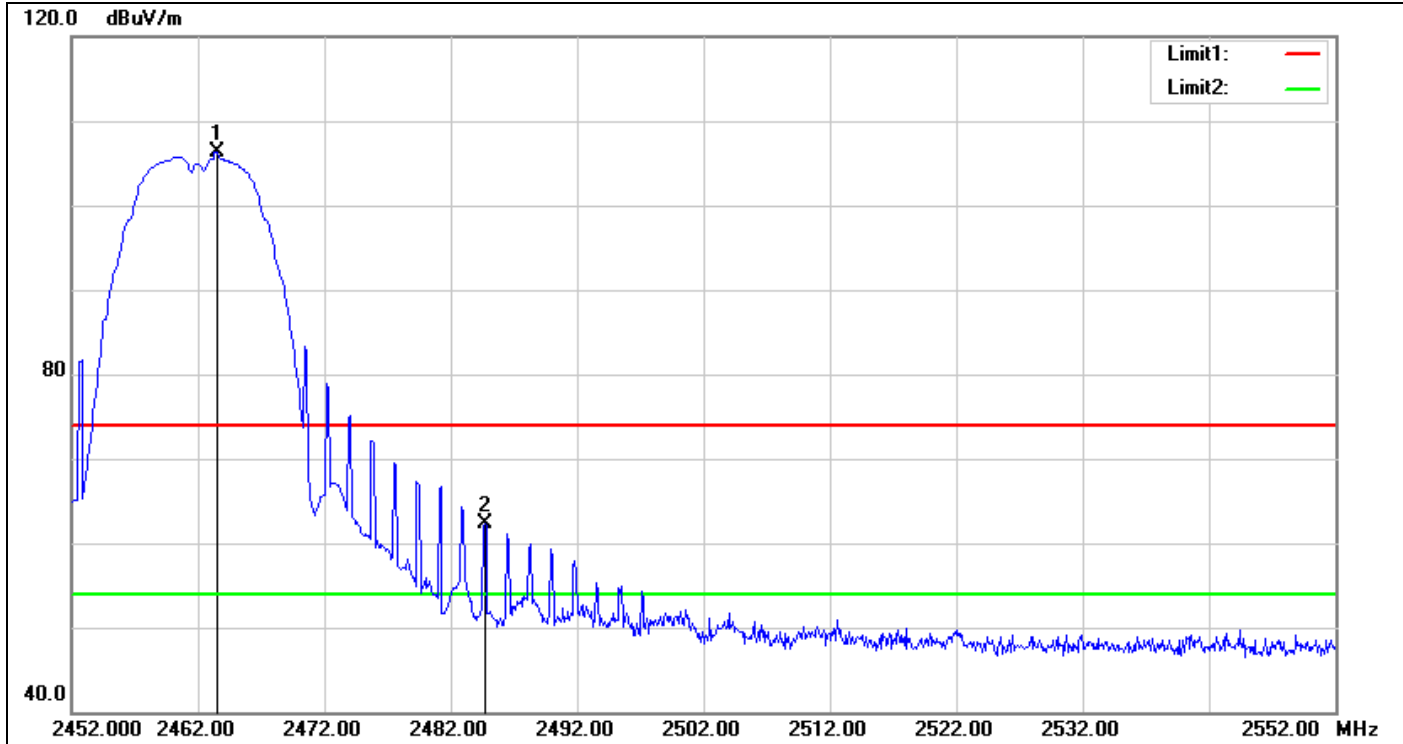


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2387.168	46.15	-3.30	42.85	54.00	-11.15	AVG
2	2414.608	104.39	-3.23	101.16	-	-	AVG

Band Edges

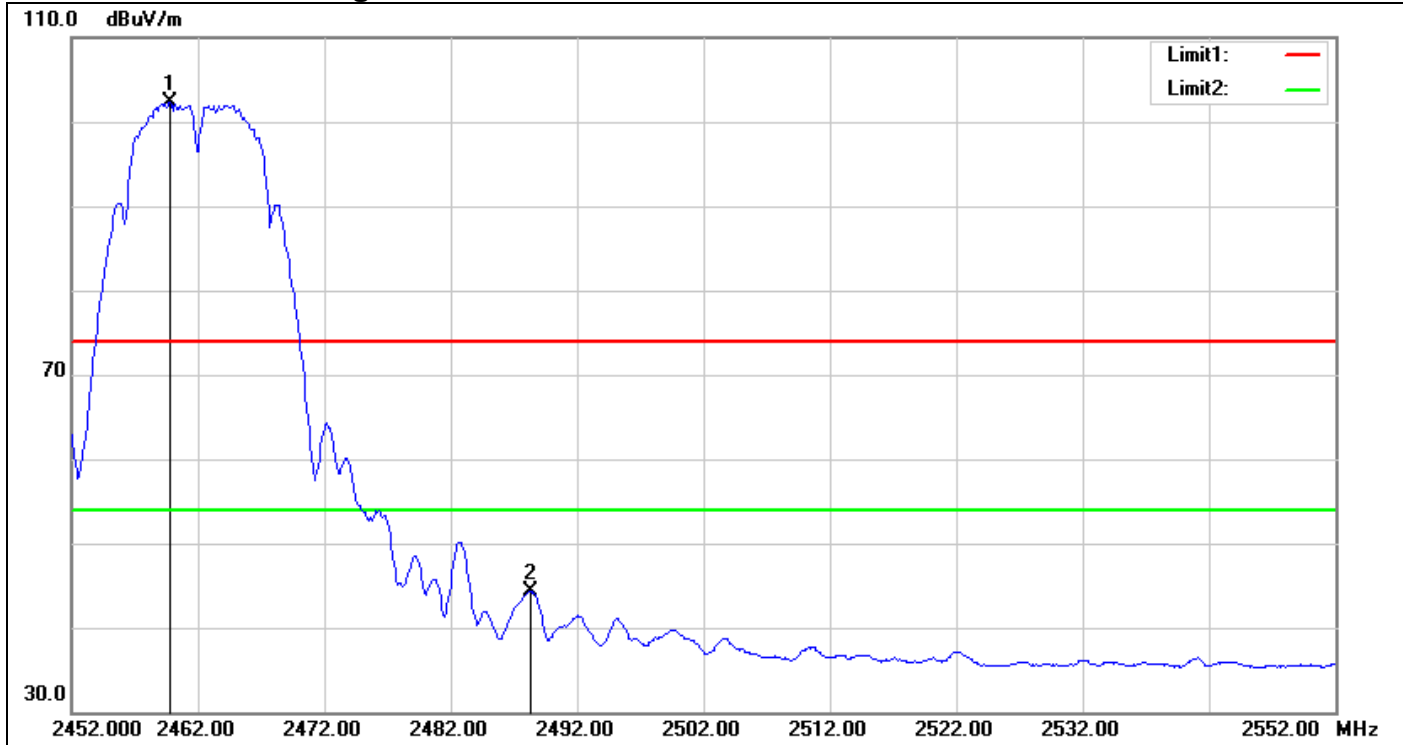
IEEE 802.11b Mode / CH High

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2463.500	109.45	-3.09	106.36	-	-	peak
2	2484.700	65.23	-3.01	62.22	74.00	-11.78	peak

Detector mode: Average

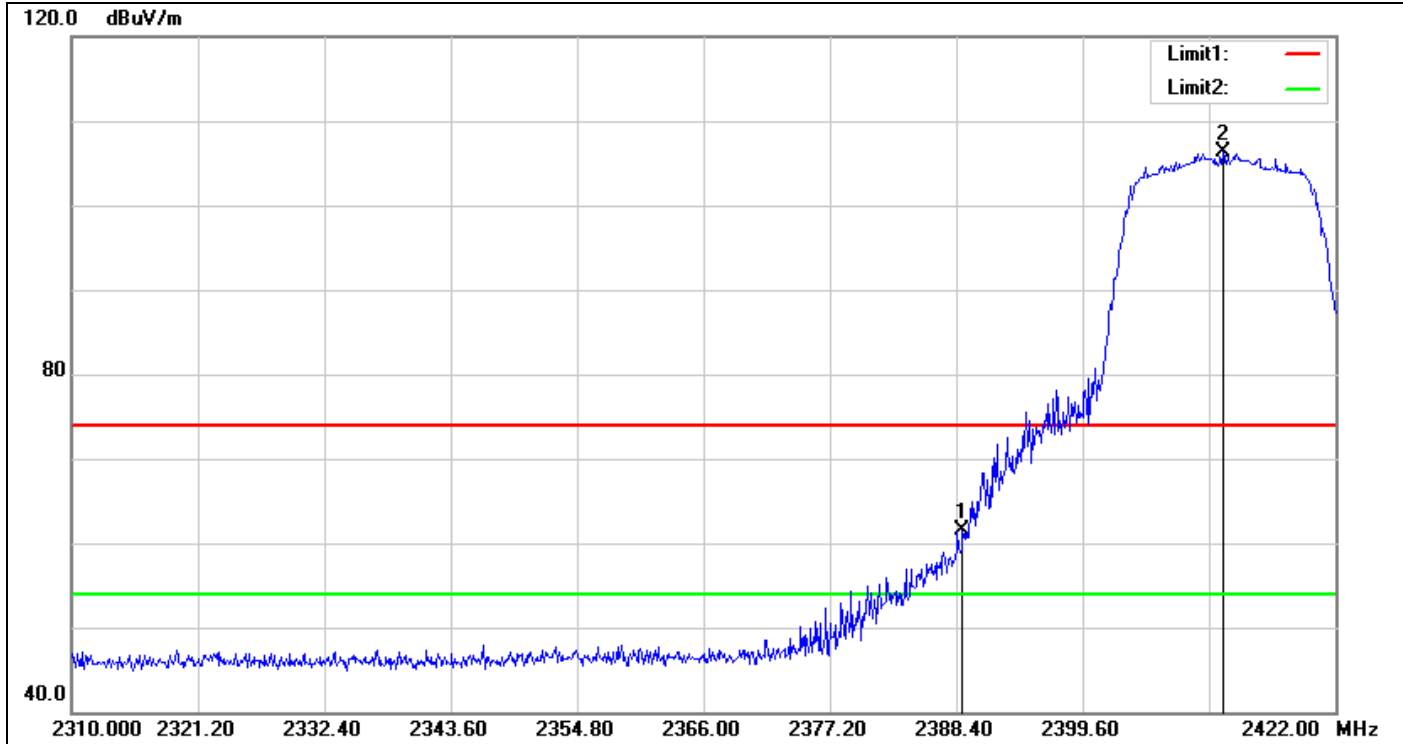


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2459.800	105.36	-3.10	102.26	-	-	AVG
2	2488.300	47.39	-3.00	44.39	54.00	-9.61	AVG

Band Edges

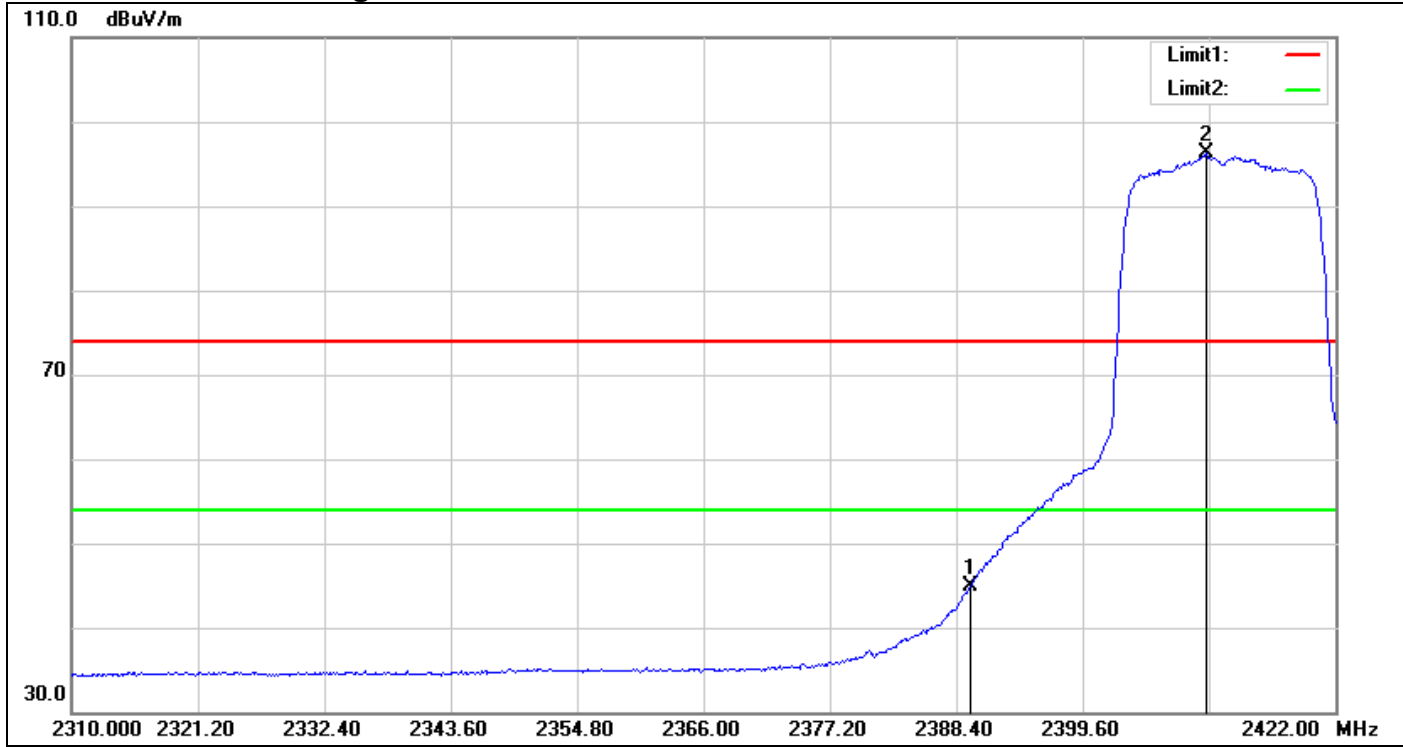
IEEE 802.11g Mode / CH Low

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2388.960	64.77	-3.29	61.48	74.00	-12.52	peak
2	2412.032	109.61	-3.23	106.38	-	-	peak

Detector mode: Average

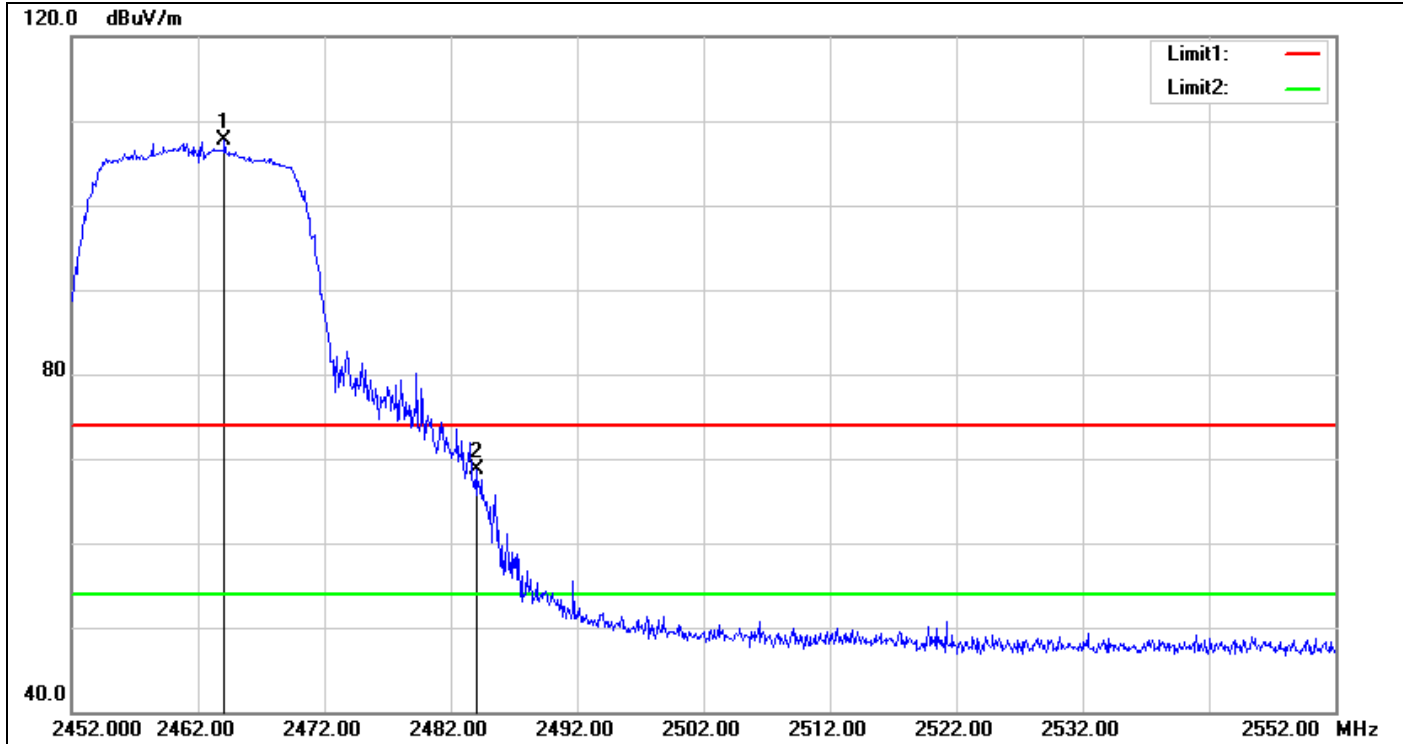


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.632	48.21	-3.28	44.93	54.00	-9.07	AVG
2	2410.576	99.49	-3.24	96.25	-	-	AVG

Band Edges

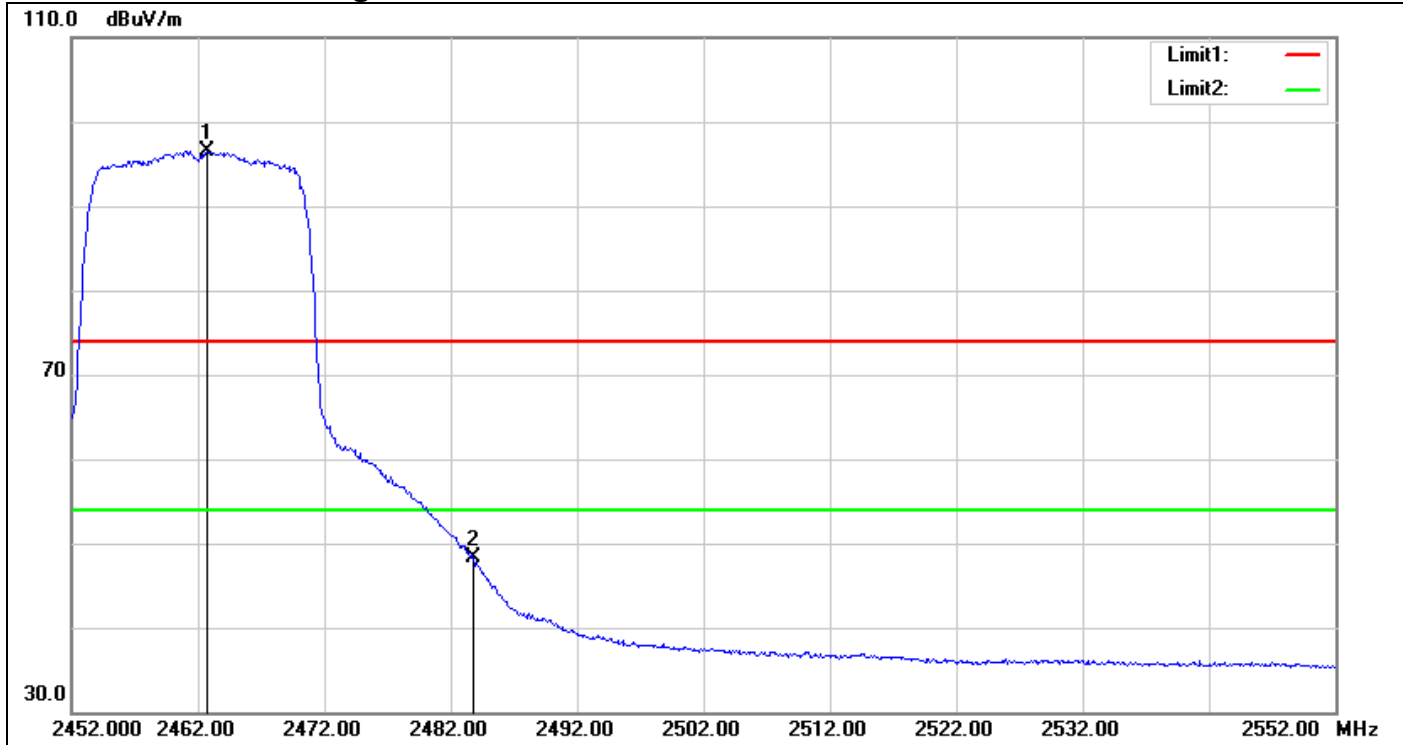
IEEE 802.11g Mode / CH High

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2464.100	110.85	-3.09	107.76	-	-	peak
2	2484.000	71.78	-3.01	68.77	74.00	-5.23	peak

Detector mode: Average

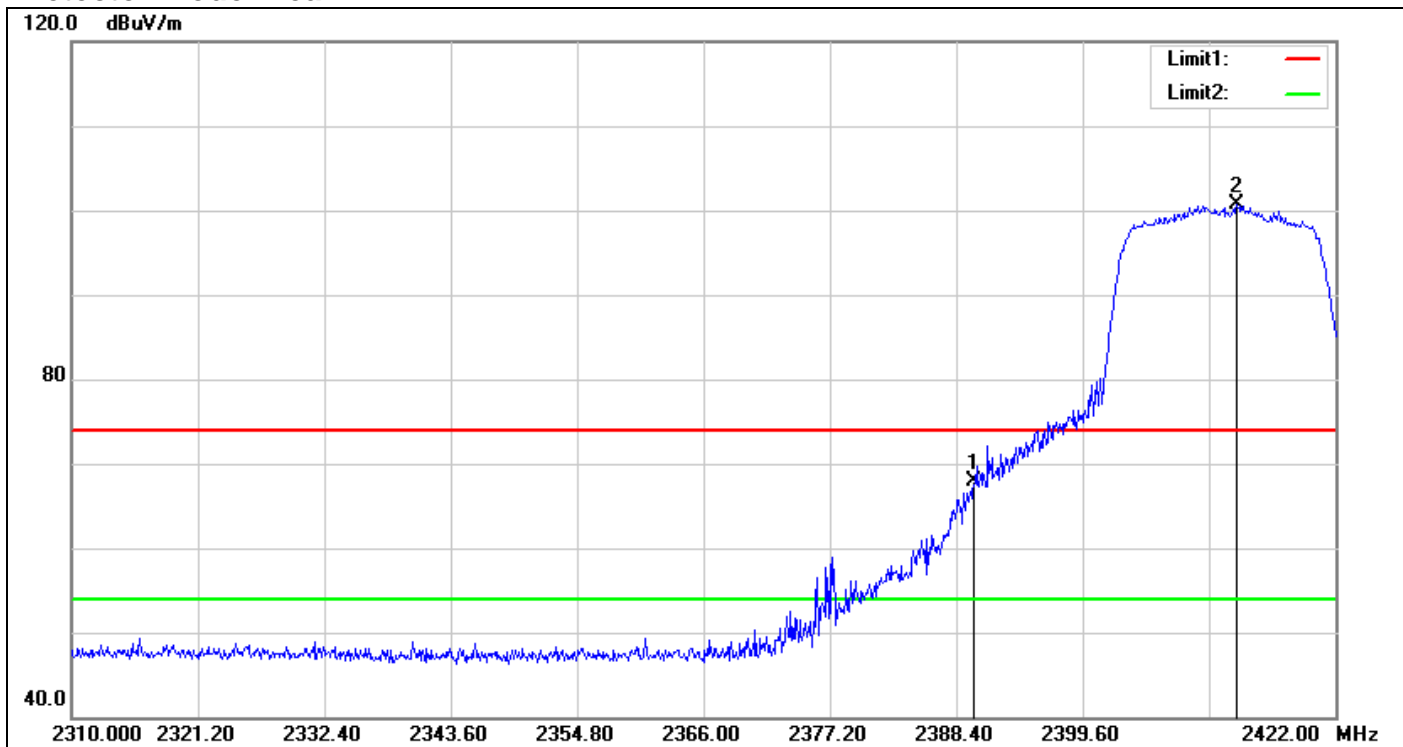


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2462.700	99.68	-3.09	96.59	-	-	AVG
2	2483.800	51.28	-3.01	48.27	54.00	-5.73	AVG

Band Edges

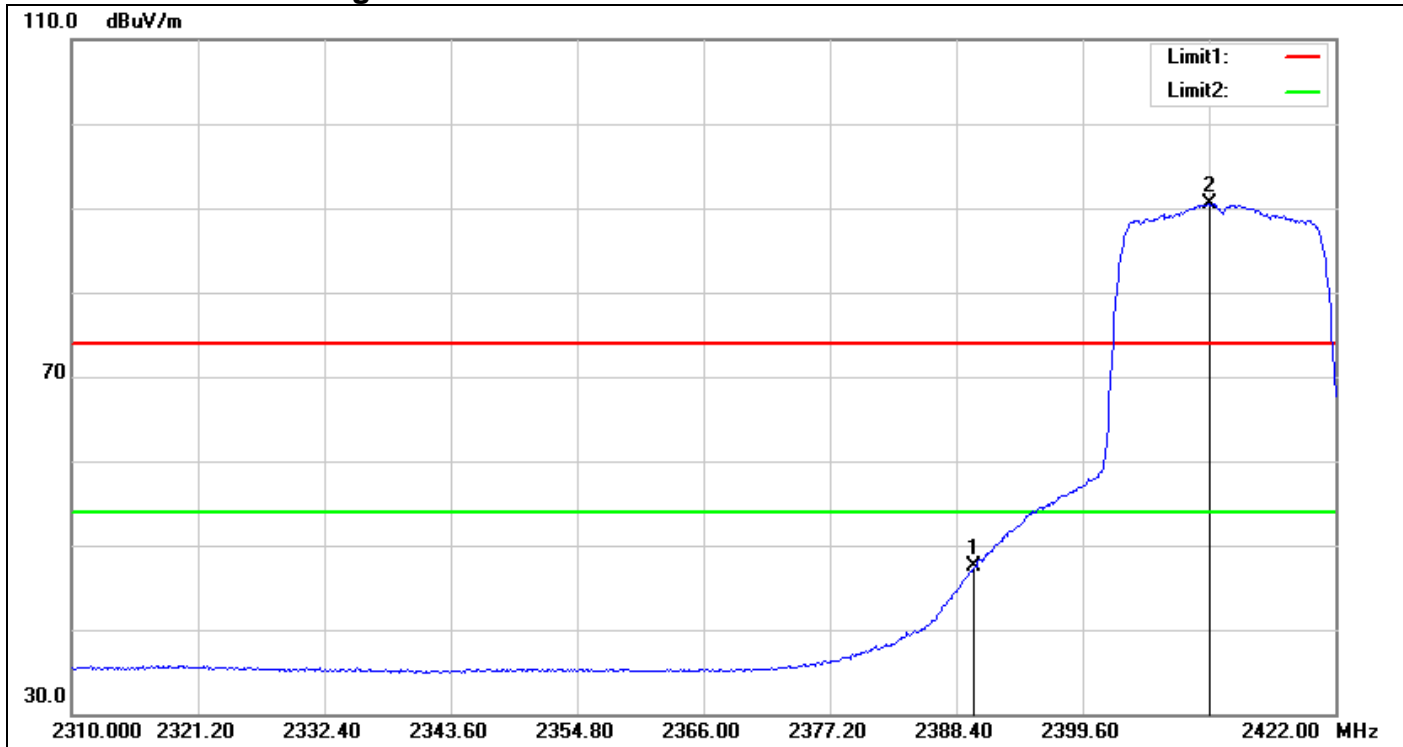
IEEE 802.11n HT 20 MHz Mode / CH Low

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	71.09	-3.28	67.81	74.00	-6.19	peak
2	2413.264	103.97	-3.23	100.74	-	-	peak

Detector mode: Average

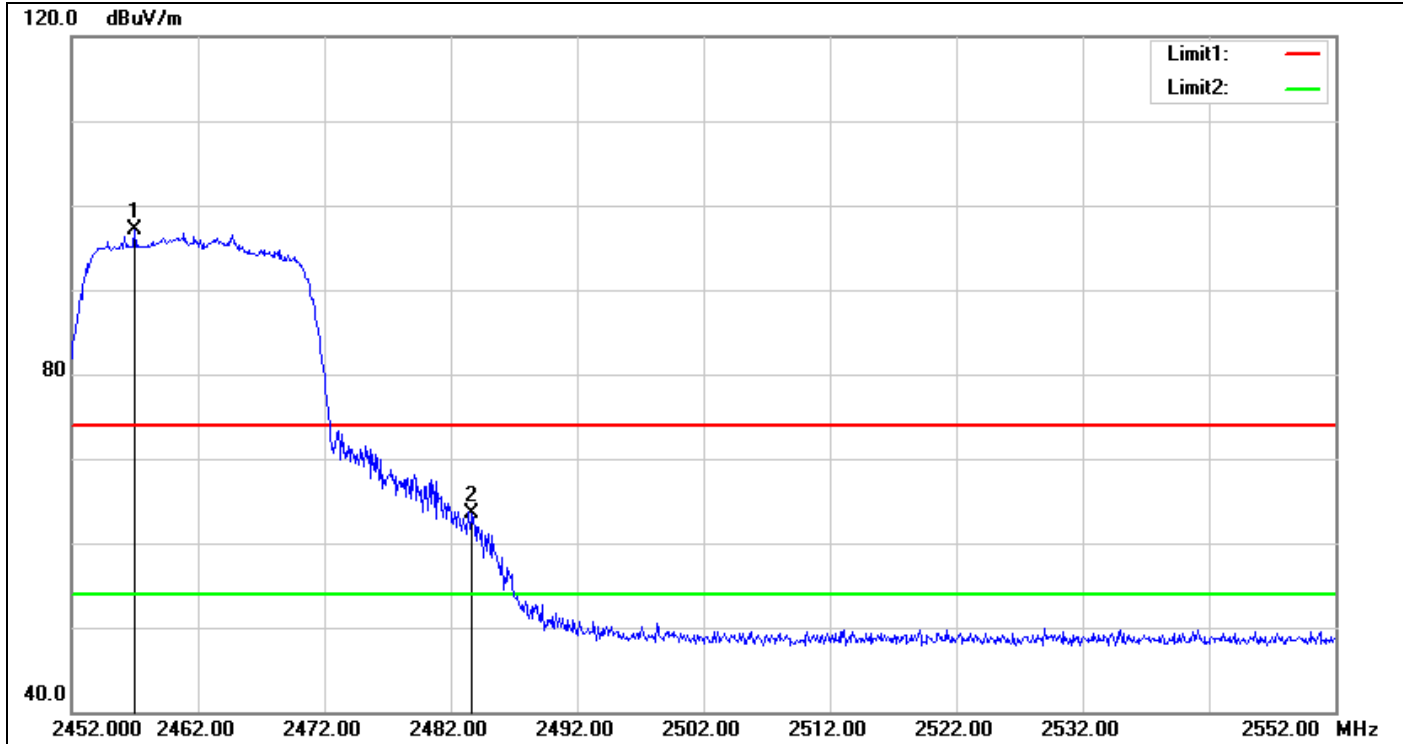


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	50.75	-3.28	47.47	54.00	-6.53	AVG
2	2410.800	93.79	-3.24	90.55	-	-	AVG

Band Edges

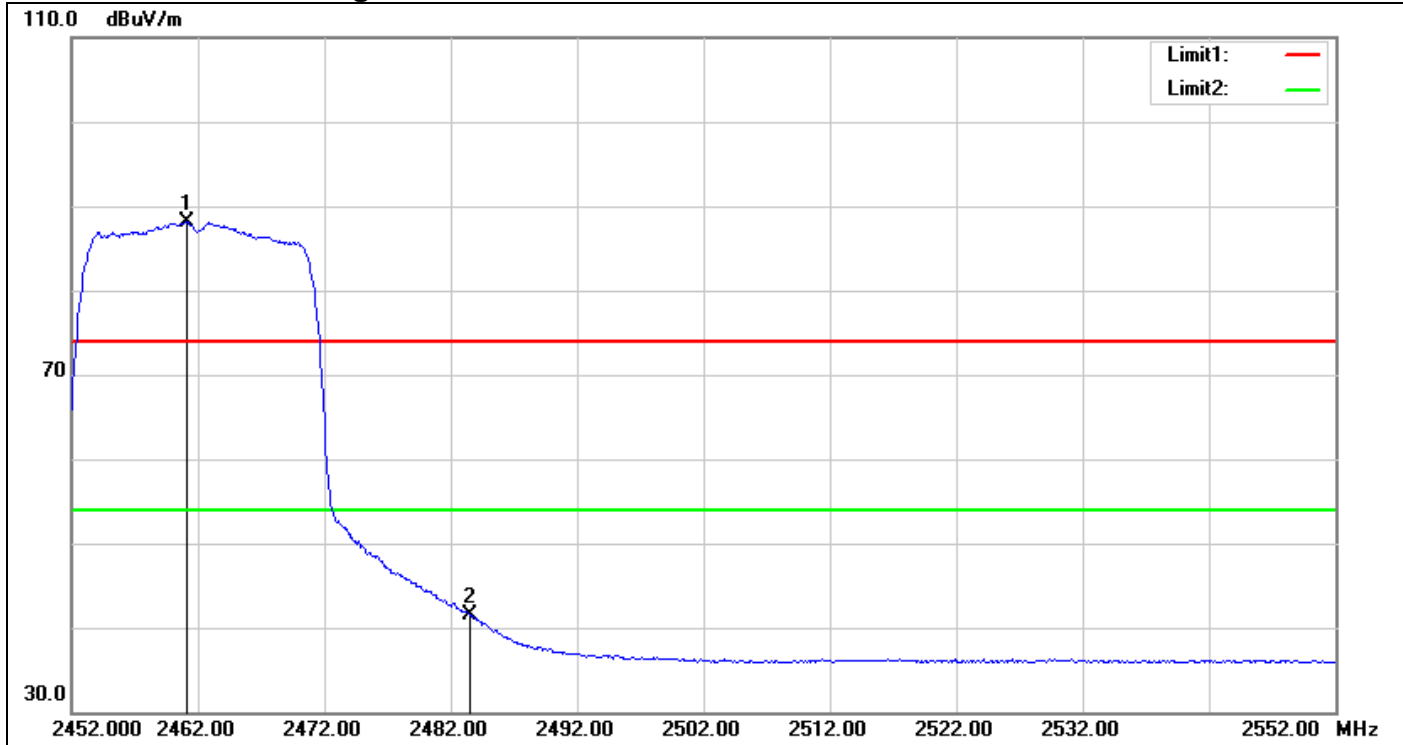
IEEE 802.11n HT 20 MHz Mode / CH High

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2457.000	99.26	-2.11	97.15	-	-	peak
2	2483.700	65.55	-1.99	63.56	74.00	-10.44	peak

Detector mode: Average

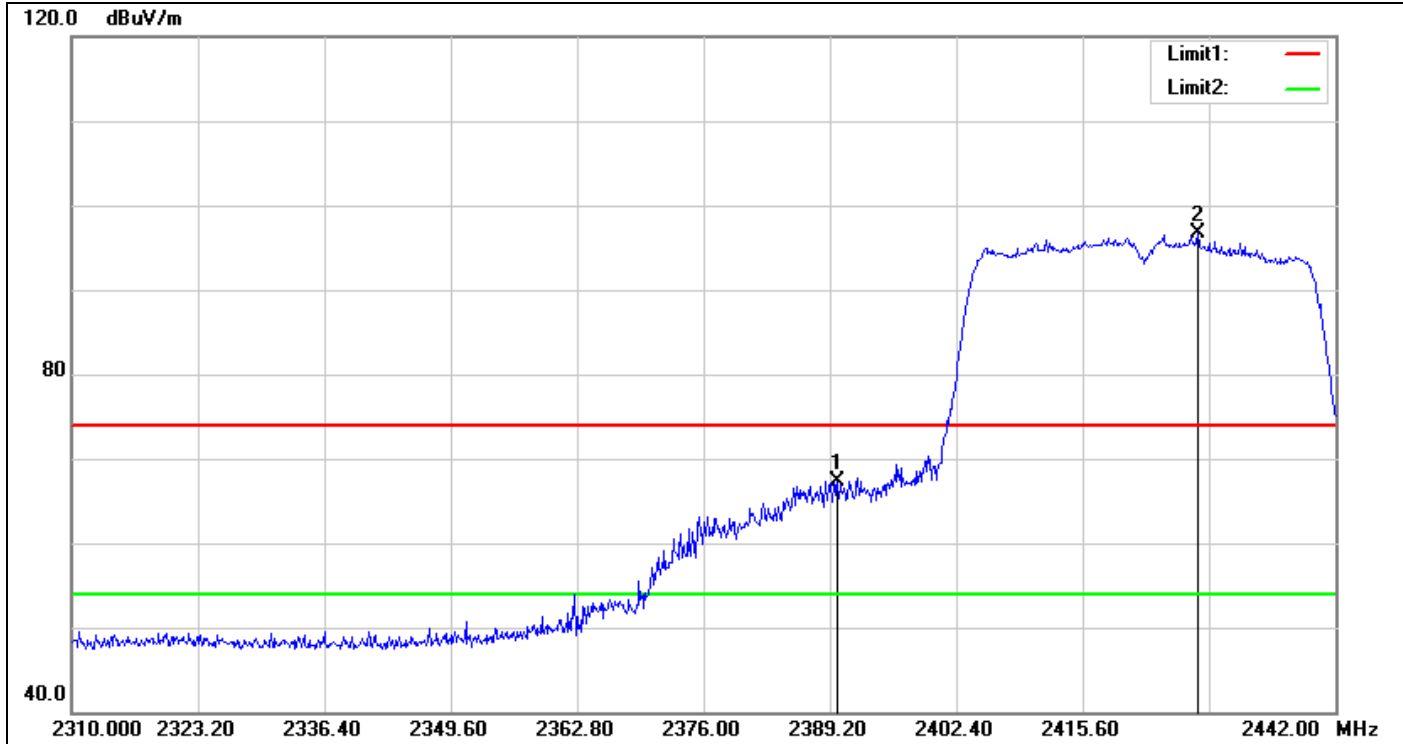


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2461.100	90.18	-2.10	88.08	-	-	AVG
2	2483.500	43.48	-1.99	41.49	54.00	-12.51	AVG

Band Edges

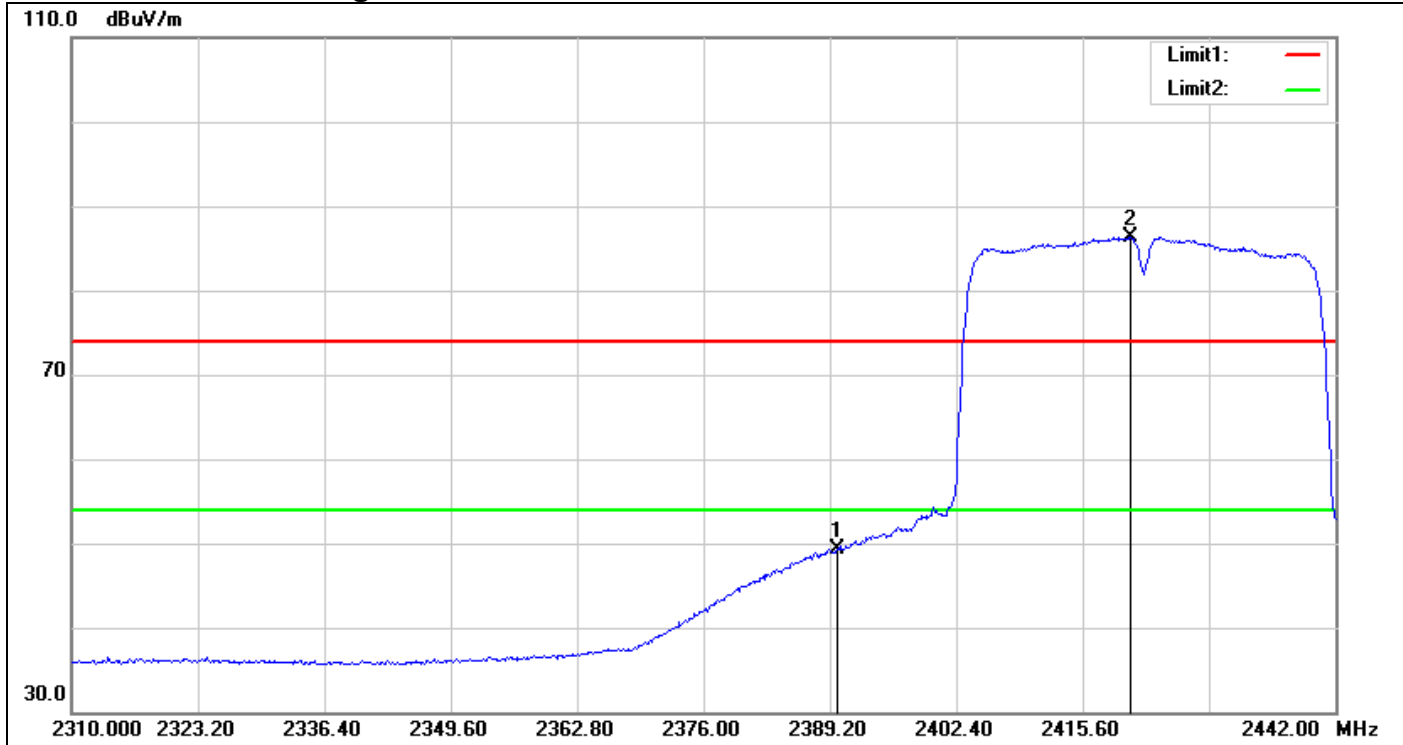
IEEE 802.11n HT 40 MHz Mode / CH Low

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.992	69.85	-2.49	67.36	74.00	-6.64	peak
2	2427.612	98.98	-2.30	96.68	-	-	peak

Detector mode: Average

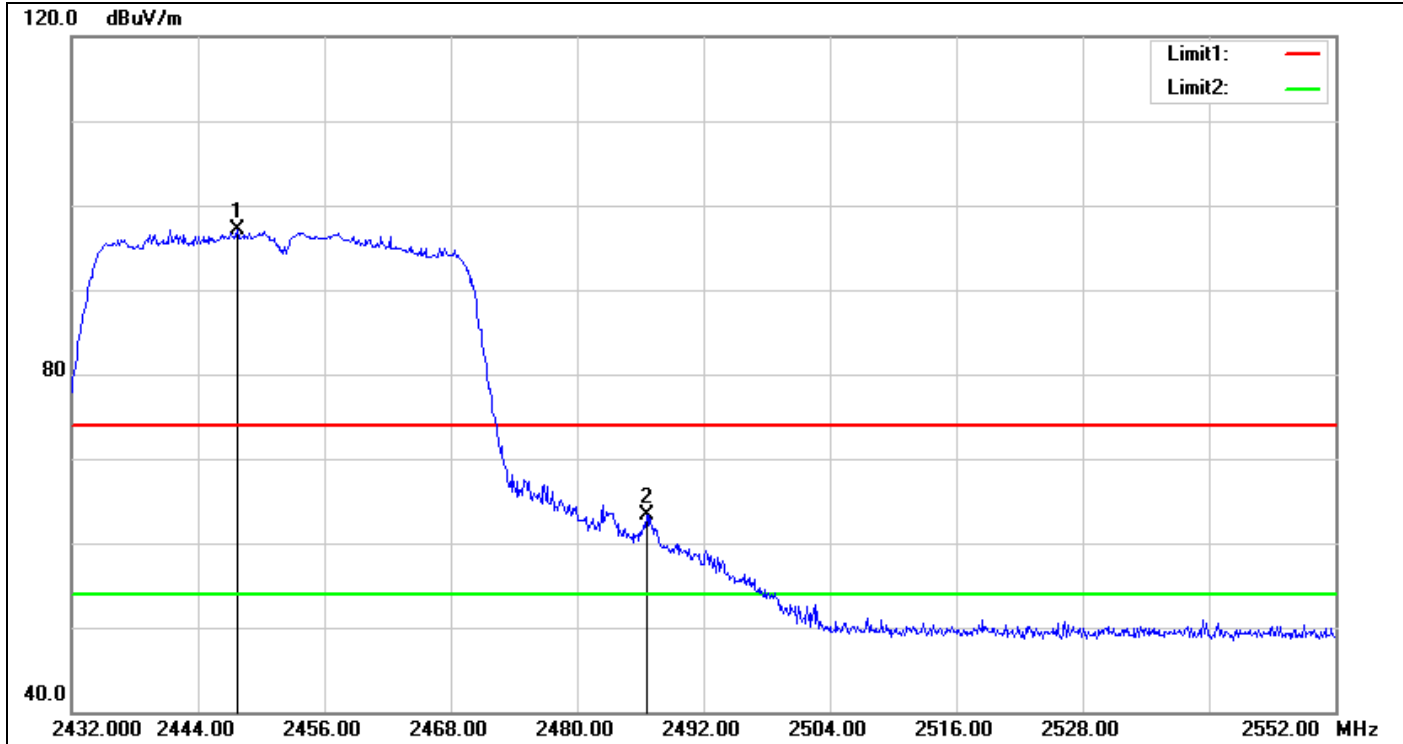


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	51.89	-2.49	49.40	54.00	-4.60	AVG
2	2420.616	88.71	-2.35	86.36	-	-	AVG

Band Edges

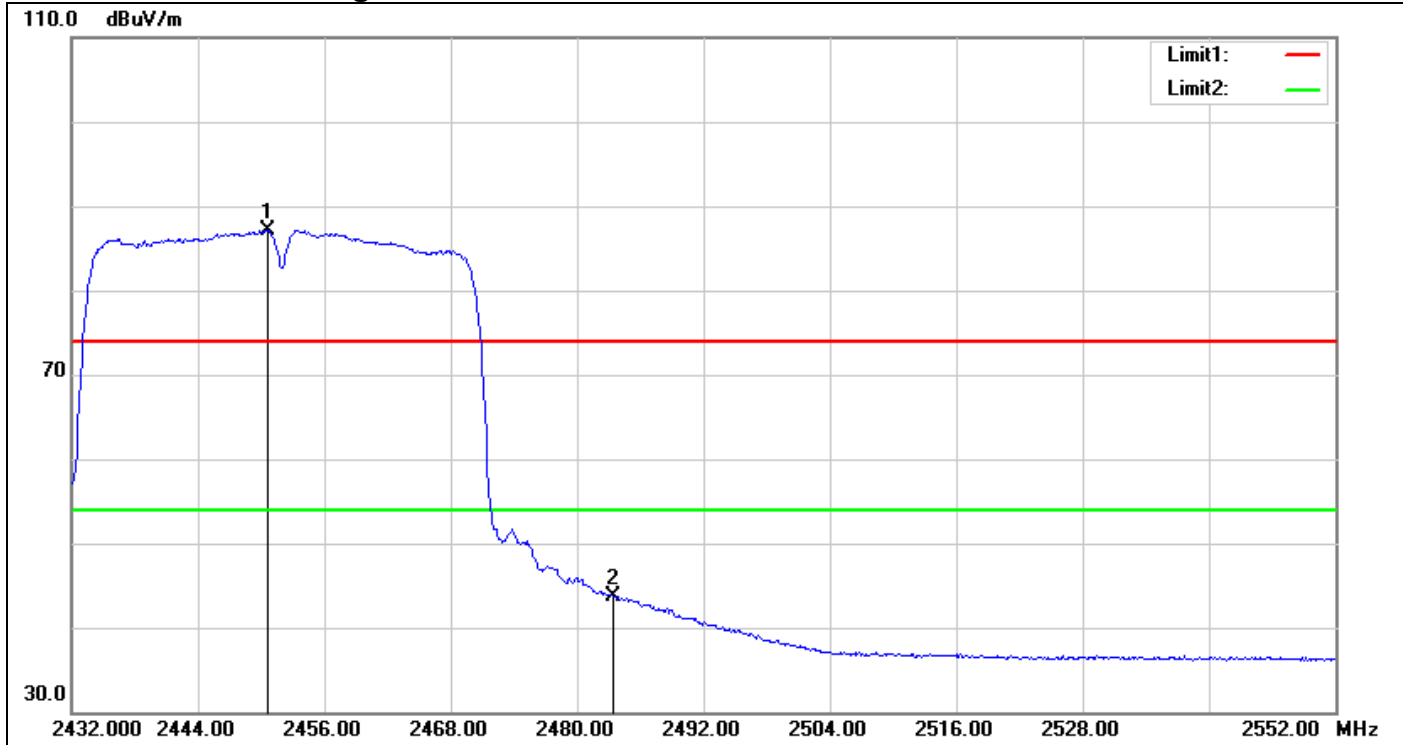
IEEE 802.11n HT 40 MHz Mode / CH High

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2447.720	99.30	-2.16	97.14	-	-	peak
2	2486.600	65.31	-1.96	63.35	74.00	-10.65	peak

Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2450.600	89.33	-2.14	87.19	-	-	AVG
2	2483.500	45.79	-1.99	43.80	54.00	-10.20	AVG

7.5 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

In any 100 kHz bandwidth outside the authorized frequency band,

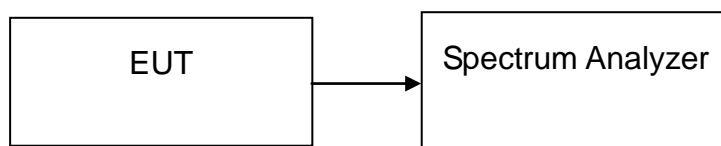
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

TEST PROCEDURE

According to KDB 558074 D01 v03r05, and 15.247(d)

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Configuration



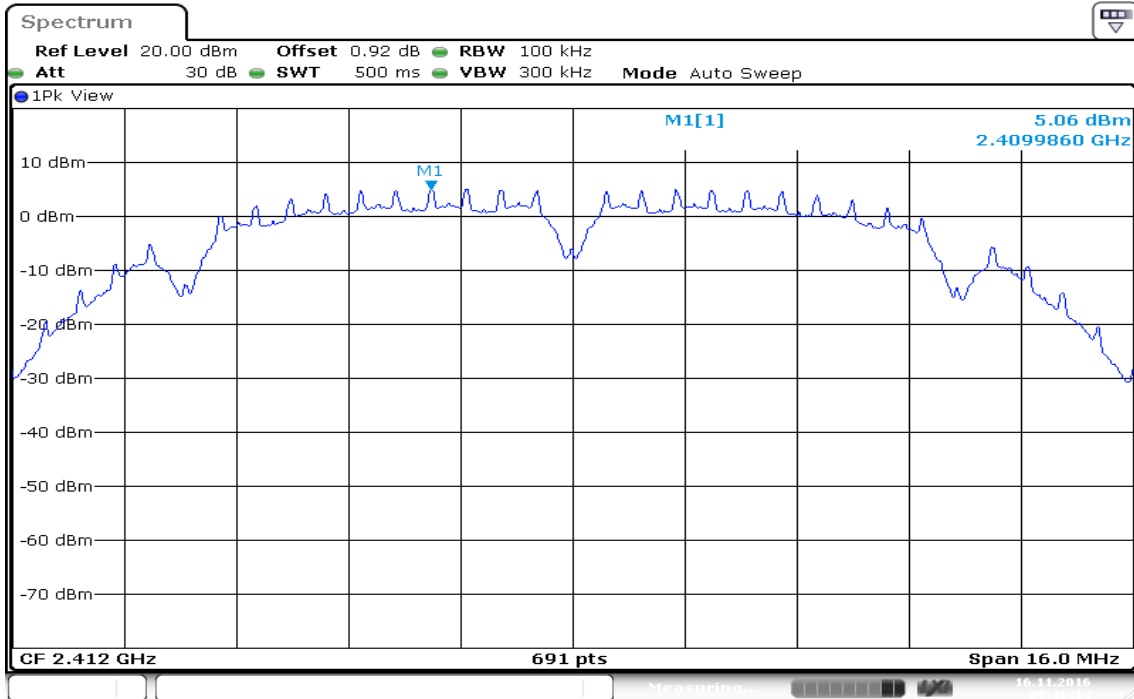
TEST RESULTS

Refer to attach spectrum analyzer data chart.

Test Data

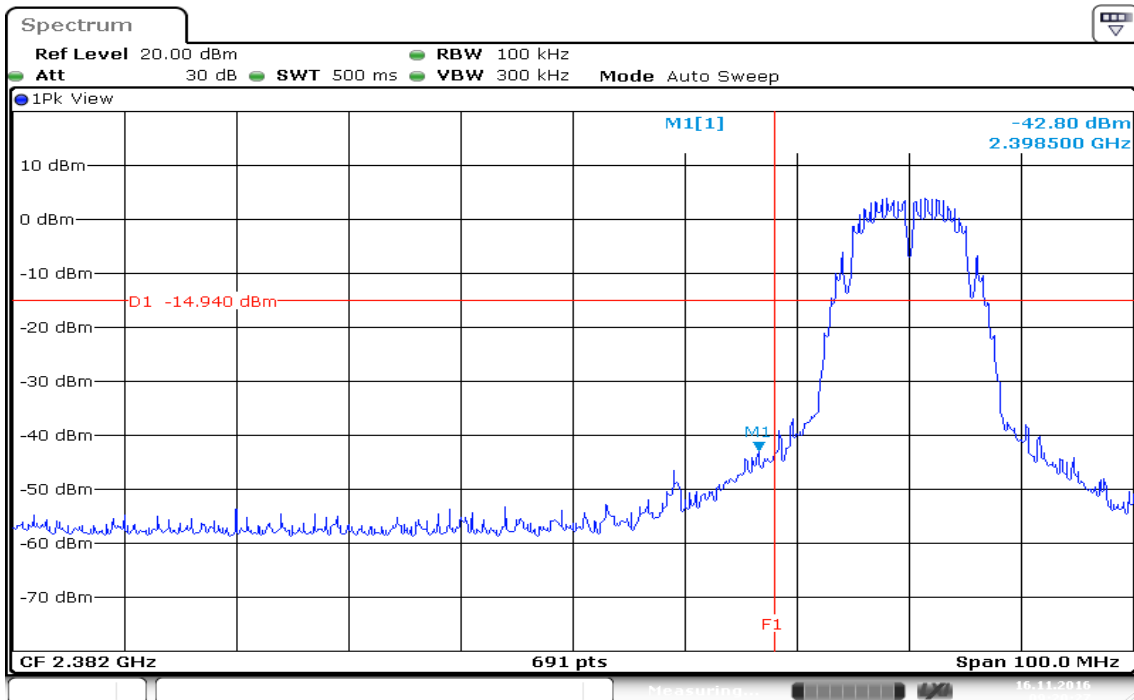
Mode: IEEE 802.11b

Low CH_100kHz PSD reference Level



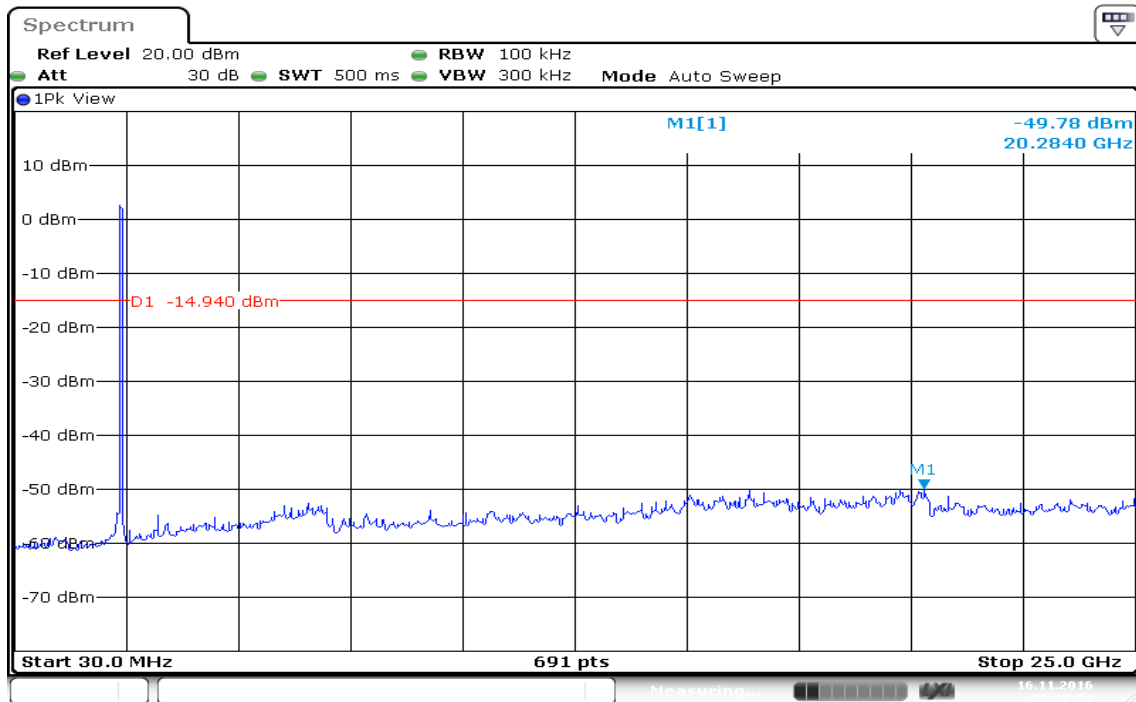
Date: 16 NOV 2016 09:16:14

Low CH_Conducted Band edge



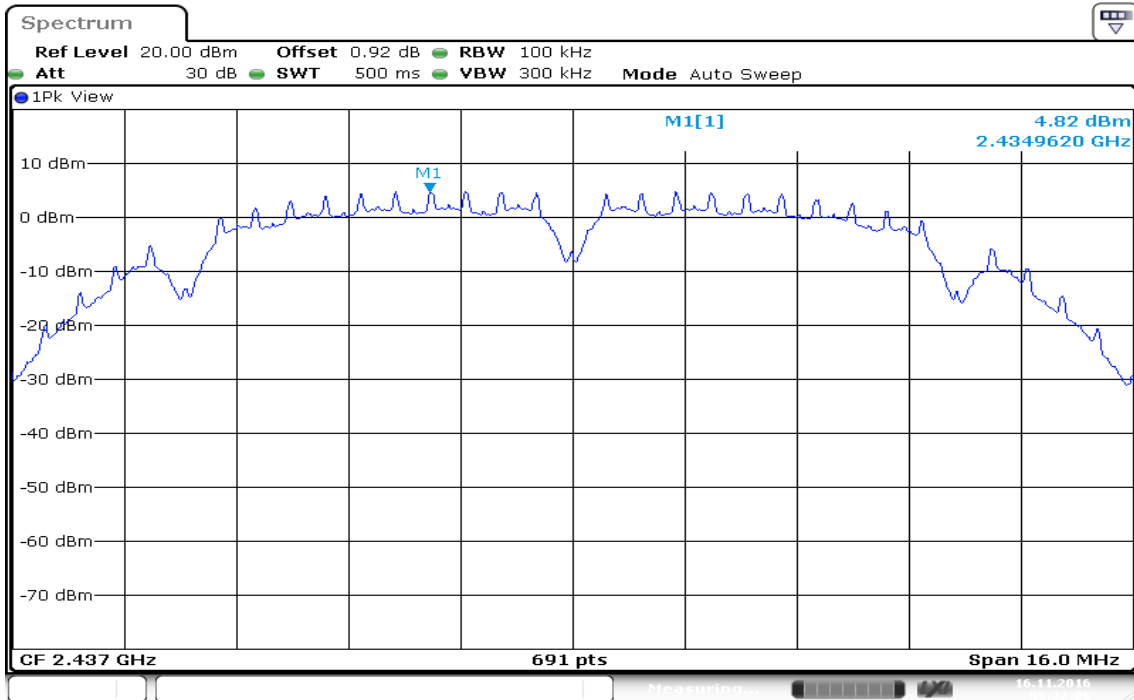
Date: 16 NOV 2016 09:20:27

Low CH_Conducted spurious emission



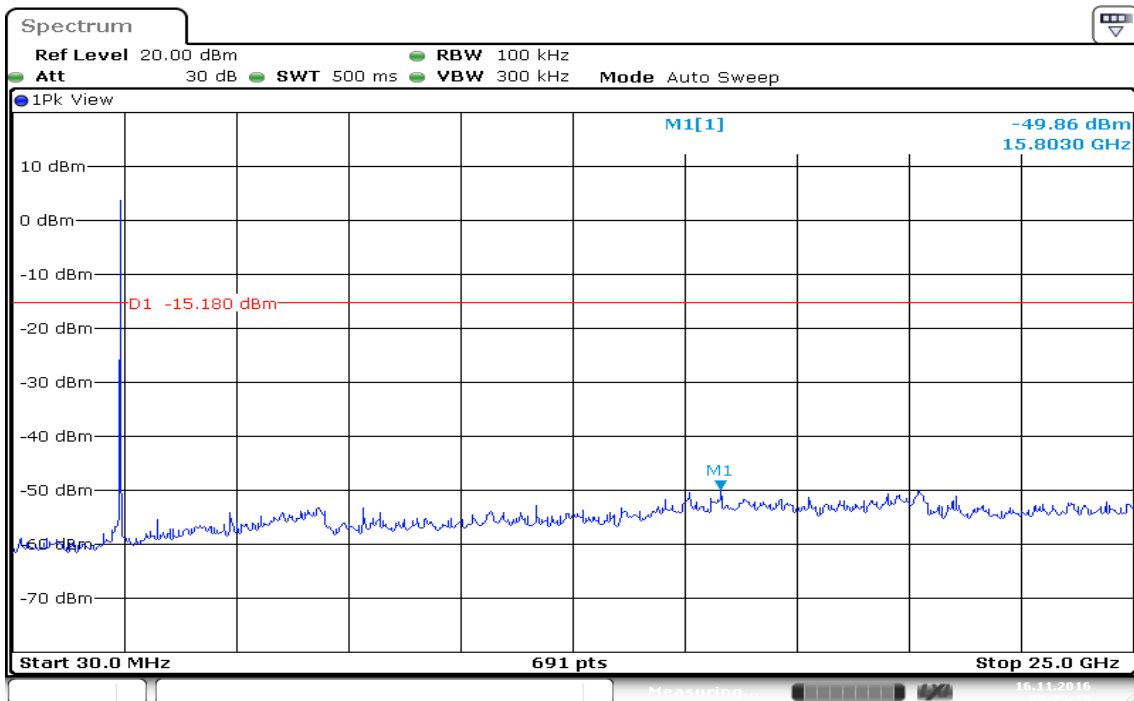
Date: 16 NOV 2016 09:18:01

Mid CH_100kHz PSD reference Level



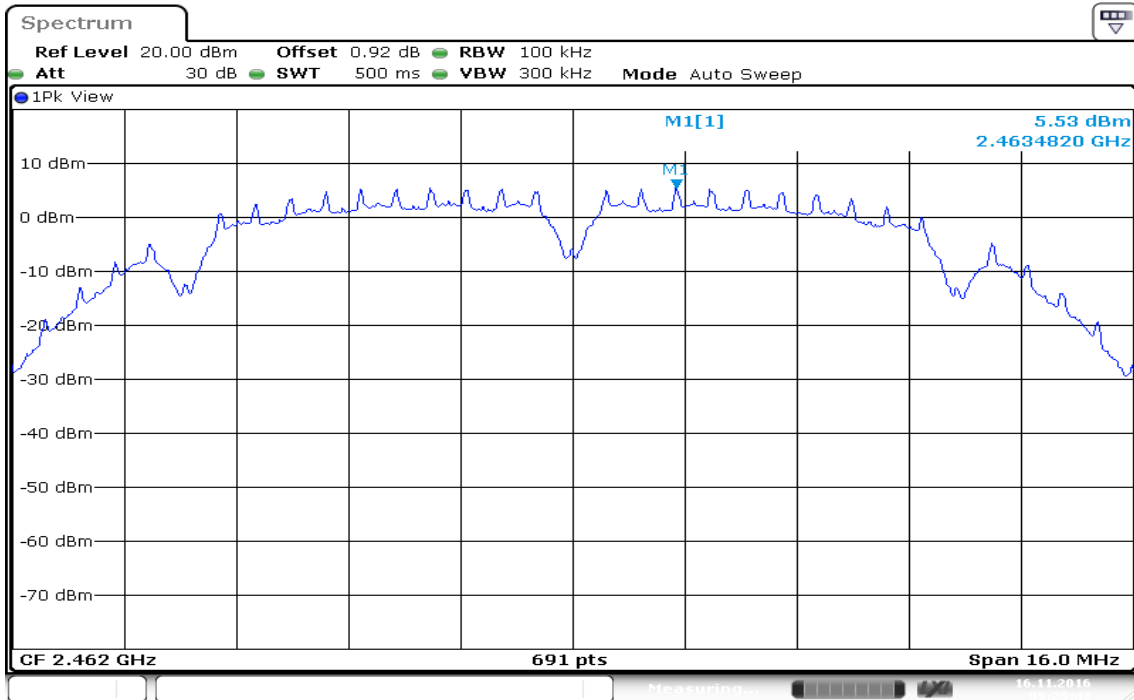
Date: 16 NOV 2016 09:22:07

Mid CH_ Conducted spurious emission

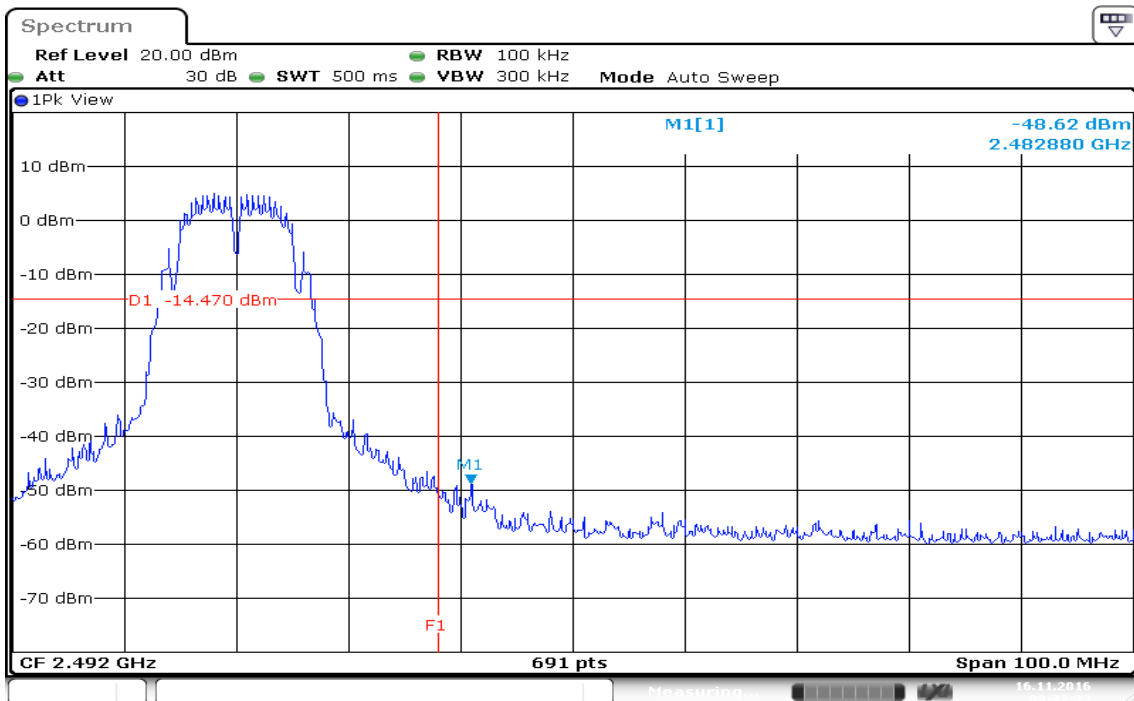


Date: 16 NOV 2016 09:23:20

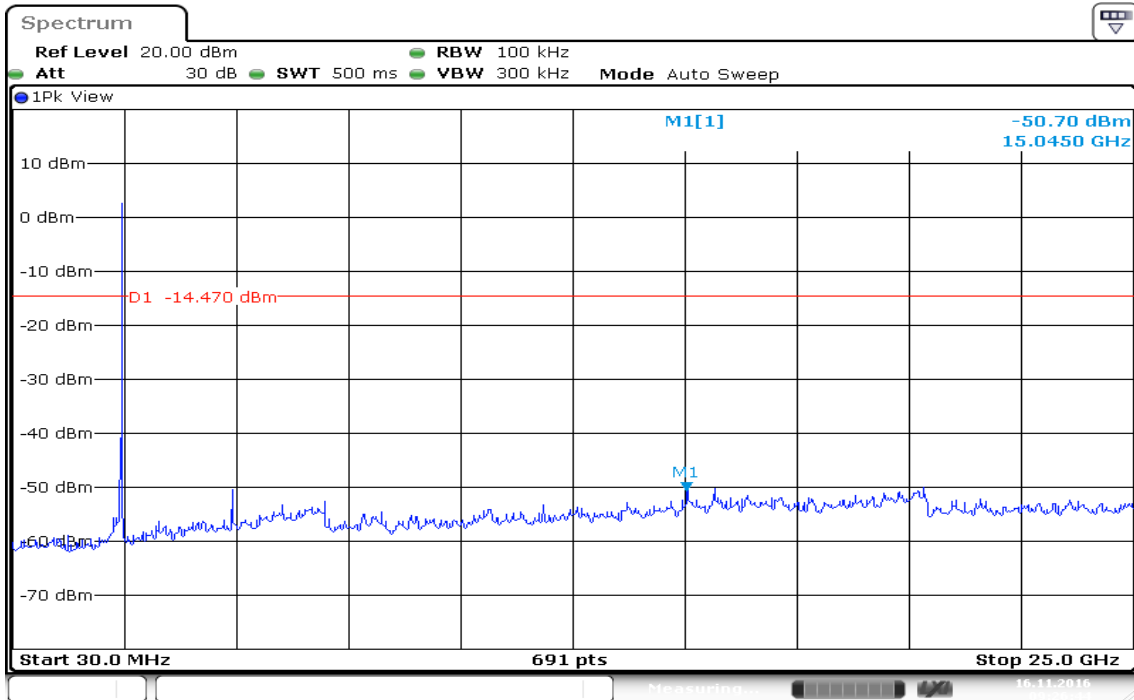
High CH_100kHz PSD reference Level



High CH_Conducted Band edge



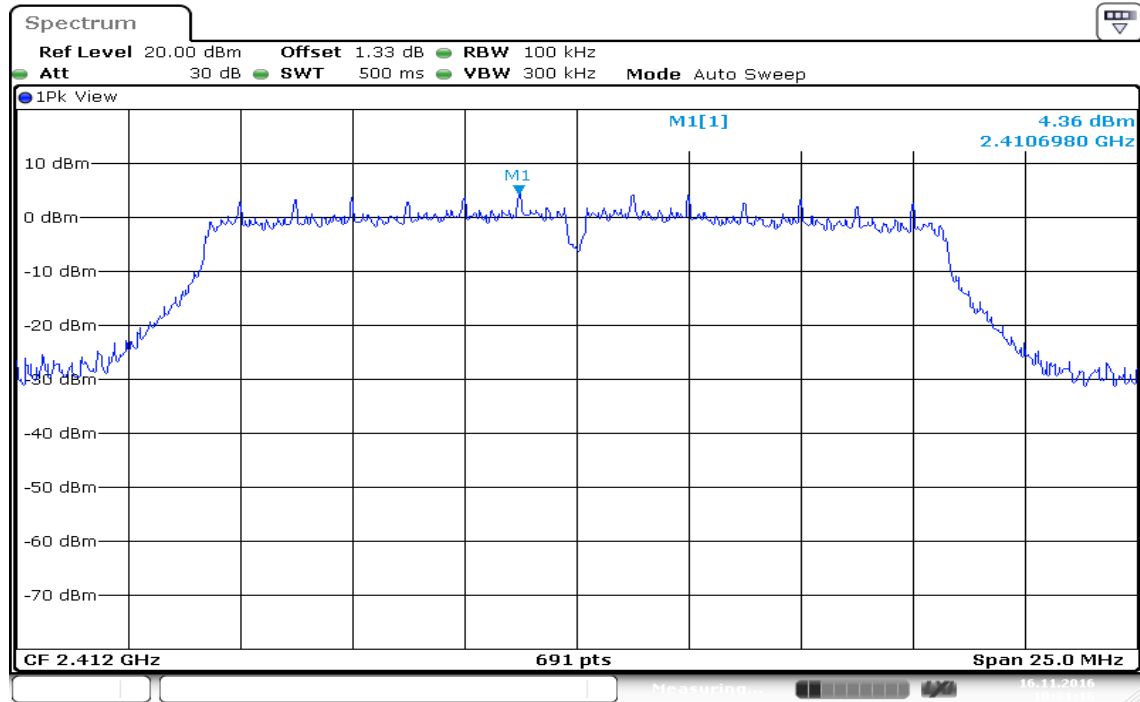
High CH_ Conducted spurious emission



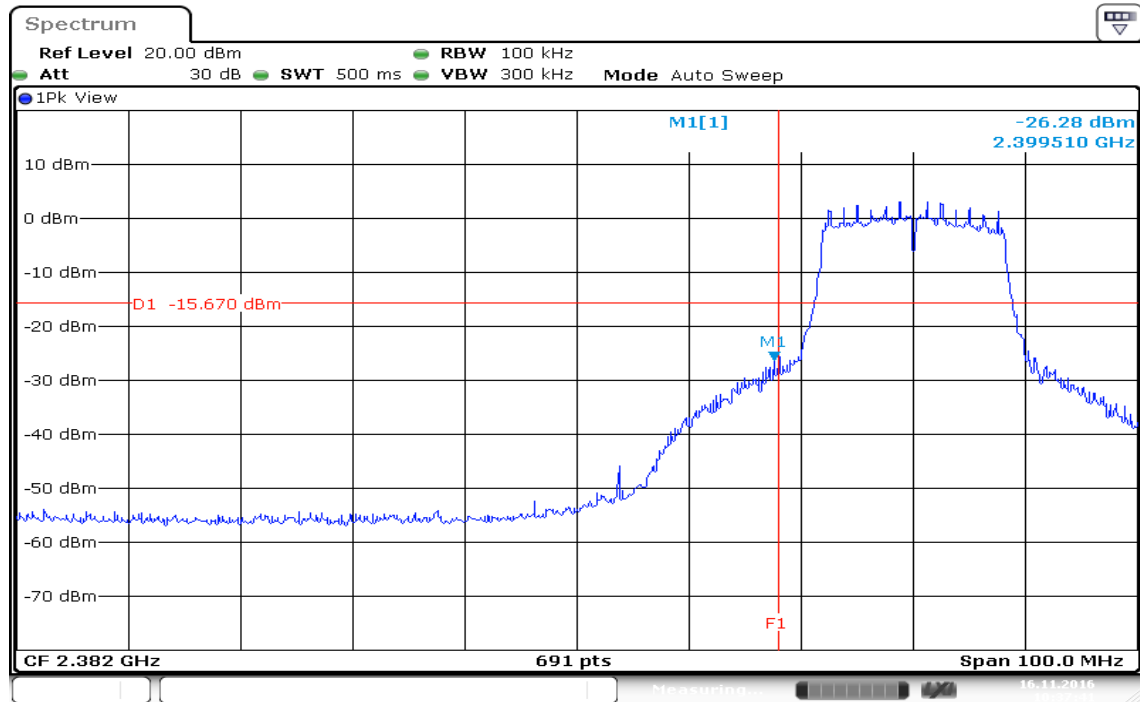
Date: 16 NOV 2016 09:26:44

Mode: IEEE 802.11g

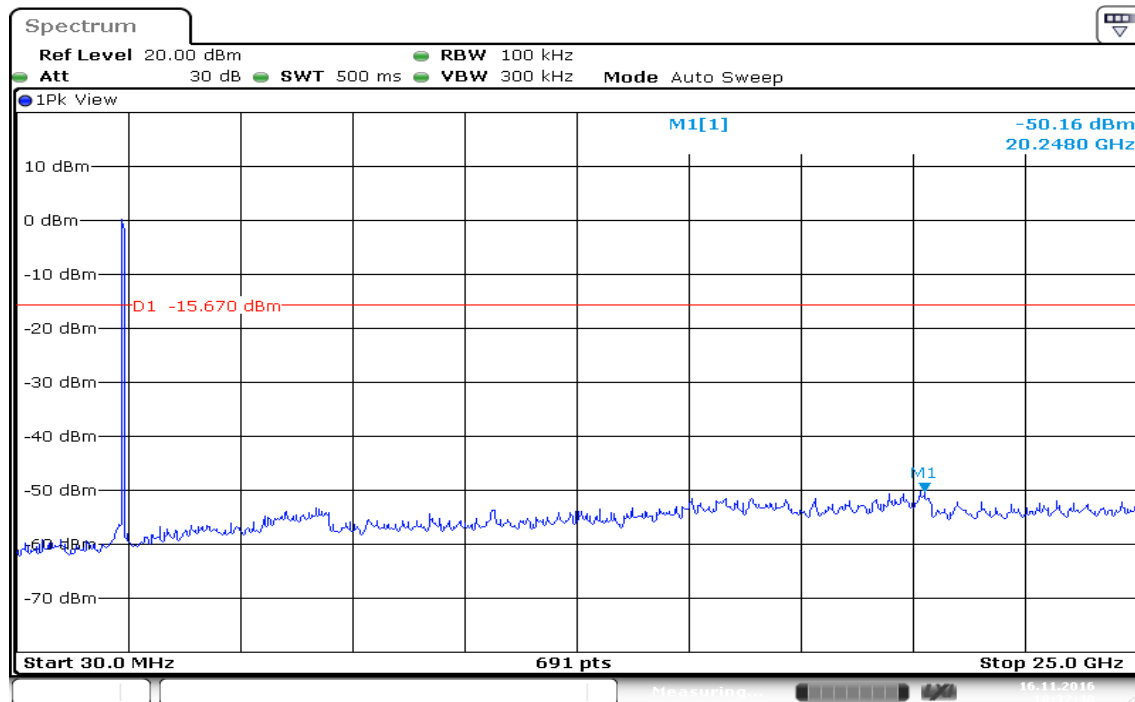
Low CH_100kHz PSD reference Level



Low CH_Conducted Band edge

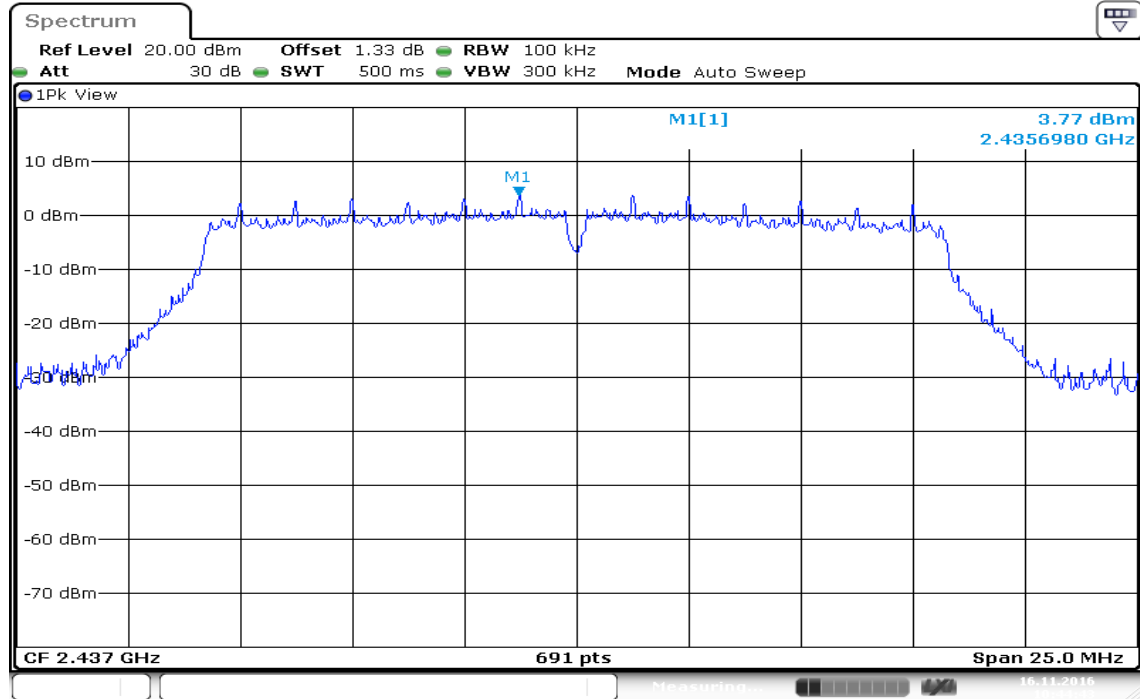


Low CH_Conducted spurious emission



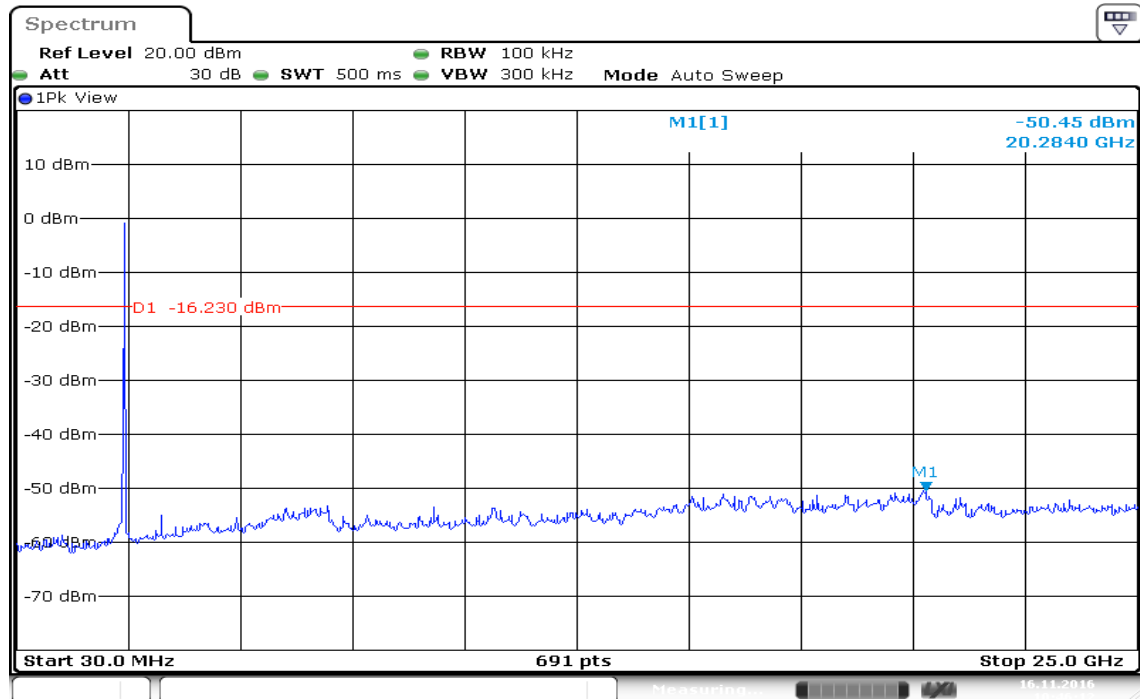
Date: 16 NOV 2016 10:32:48

Mid CH_100kHz PSD reference Level



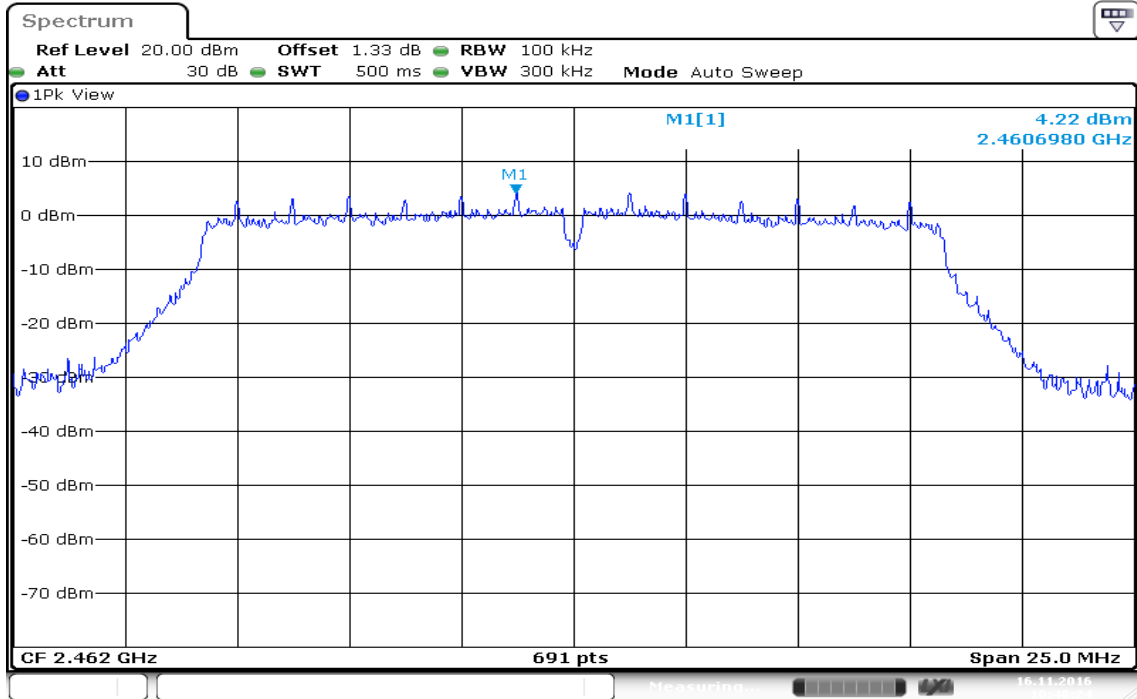
Date: 16 NOV 2016 10:44:43

Mid CH_ Conducted spurious emission



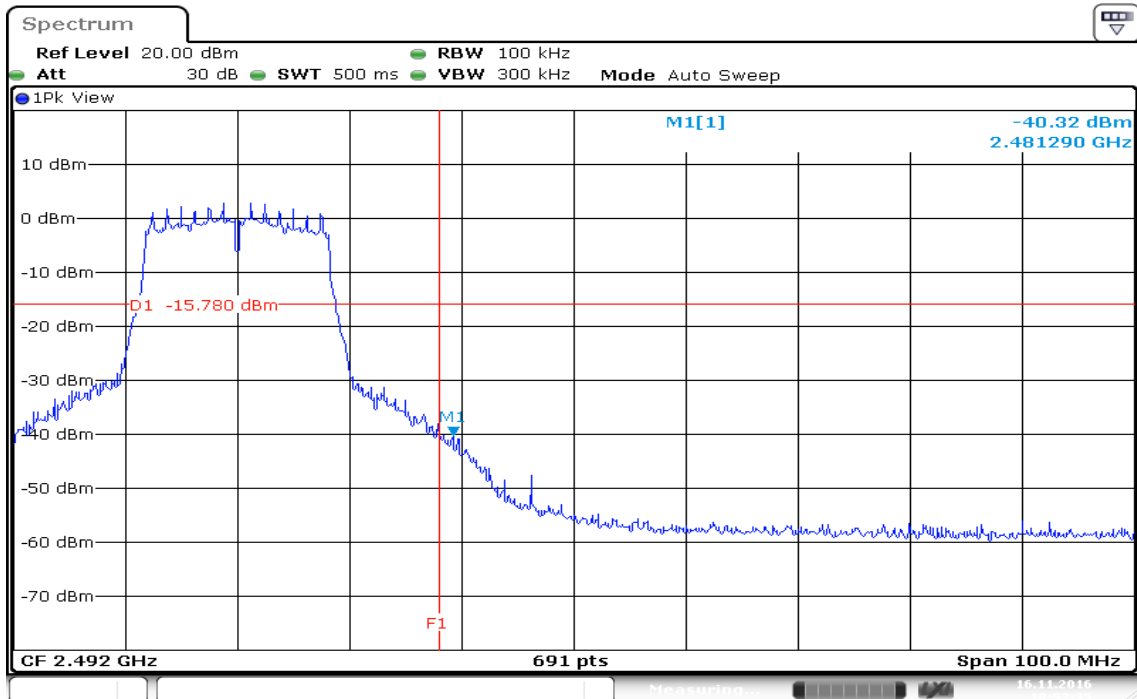
Date: 16 NOV 2016 10:46:13

High CH_100kHz PSD reference Level



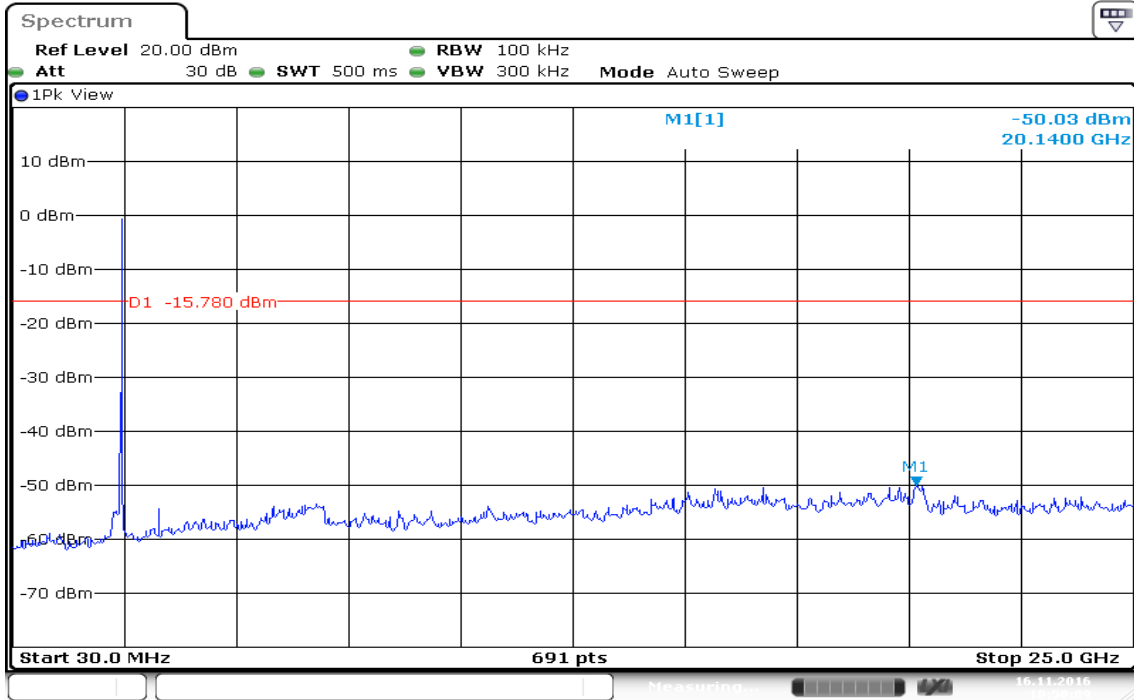
Date: 16 NOV 2016 10:48:25

High CH_Conducted Band edge



Date: 16 NOV 2016 10:53:36

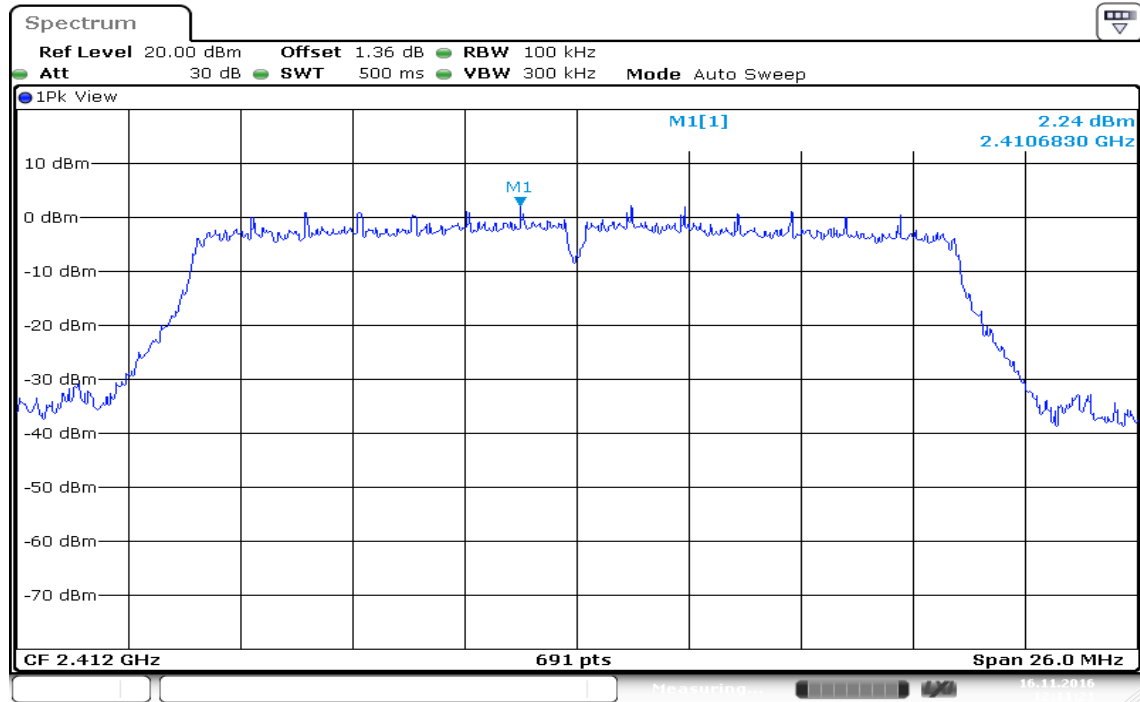
High CH_ Conducted spurious emission



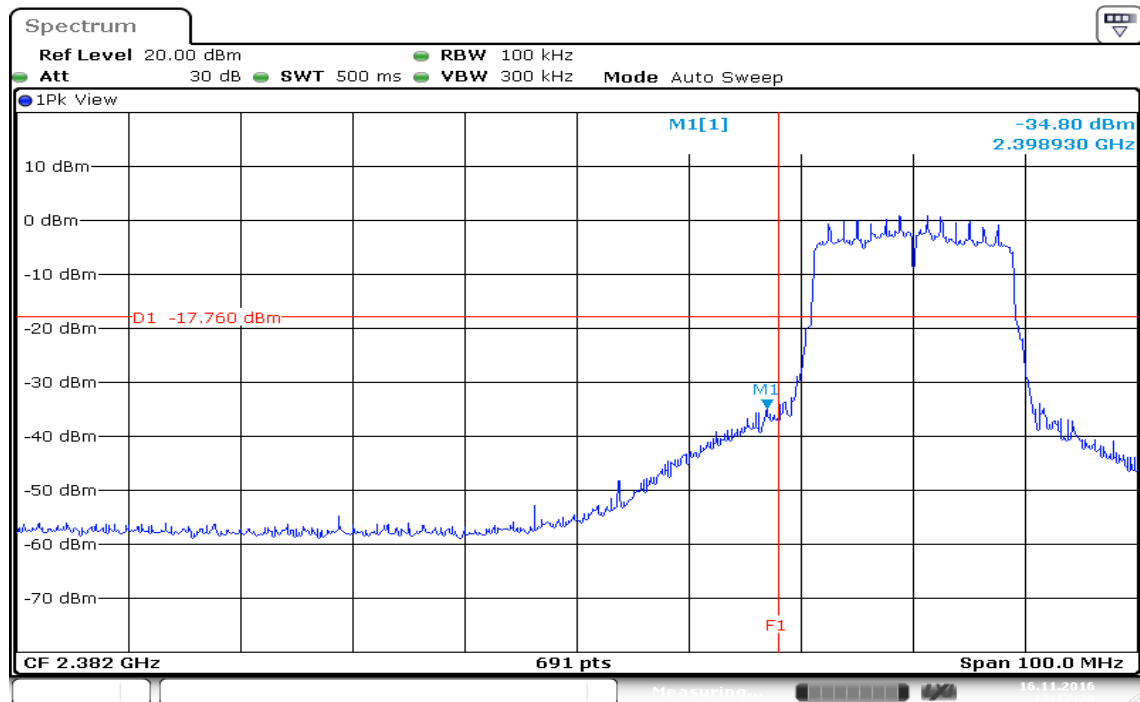
Date: 16 NOV 2016 10:50:09

Mode: IEEE 802.11n HT20 / chain 0

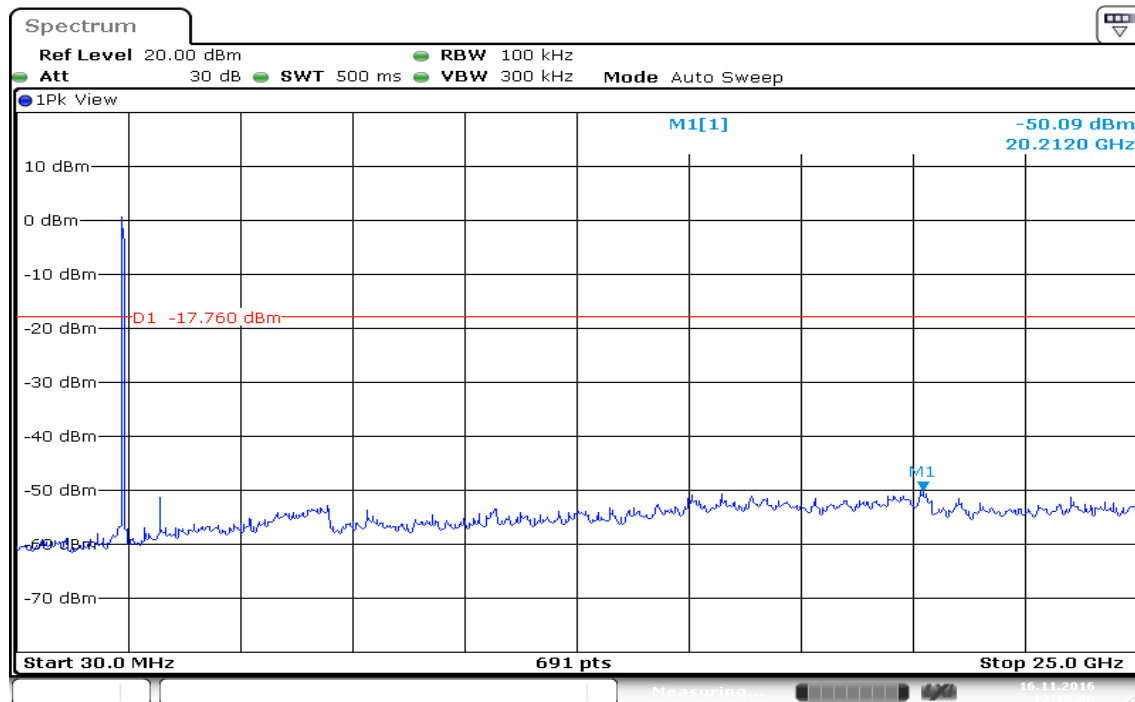
Low CH_100kHz PSD reference Level



Low CH_Conducted Band edge

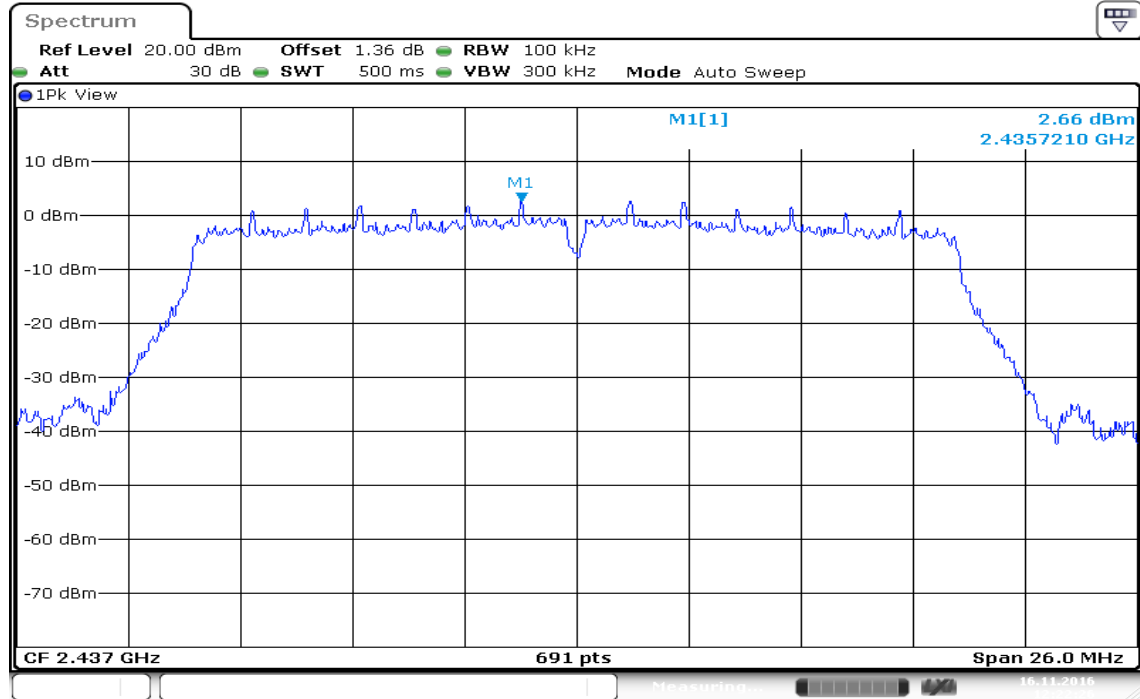


Low CH_Conducted spurious emission

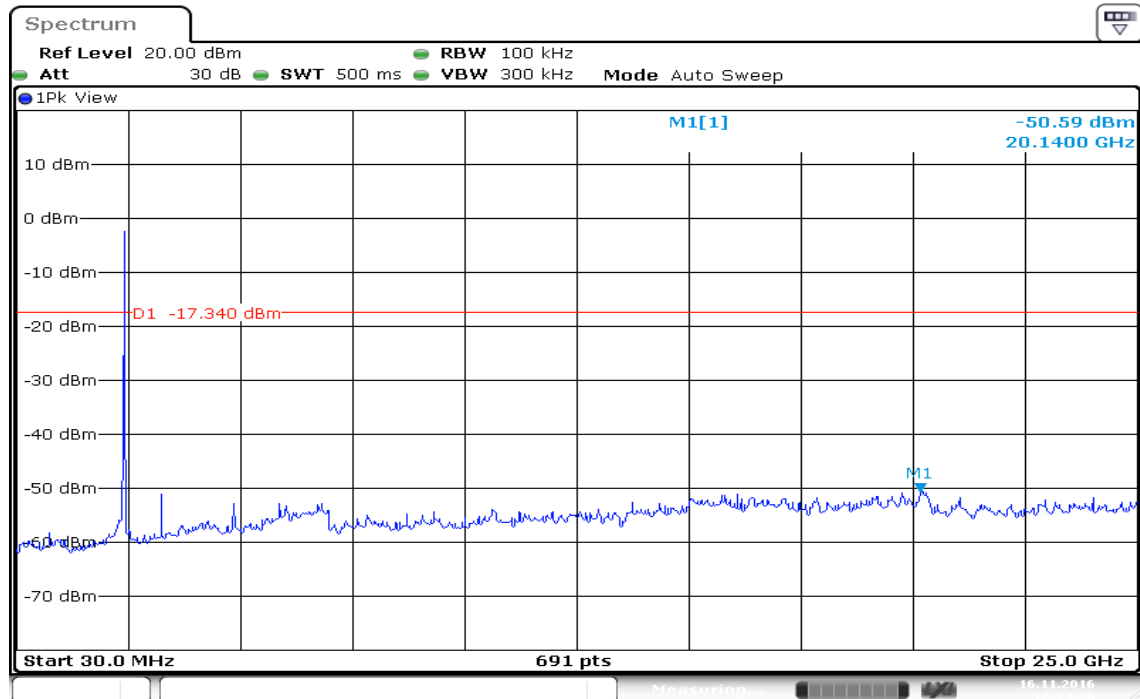


Date: 16 NOV 2016 12:16:06

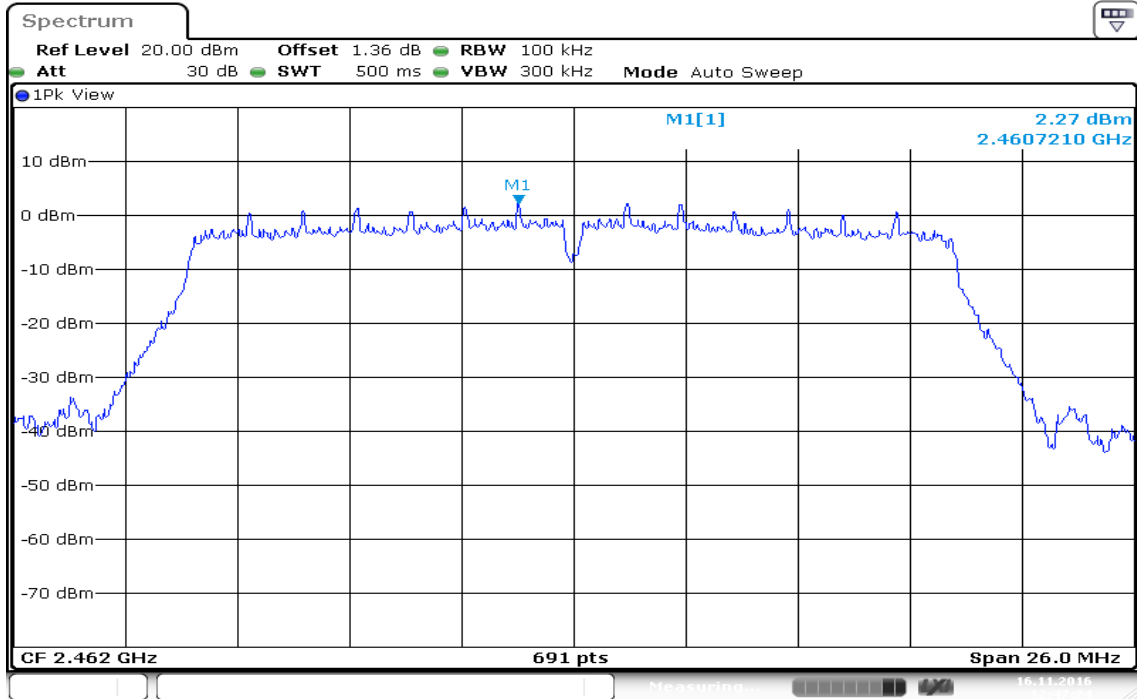
Mid CH_100kHz PSD reference Level



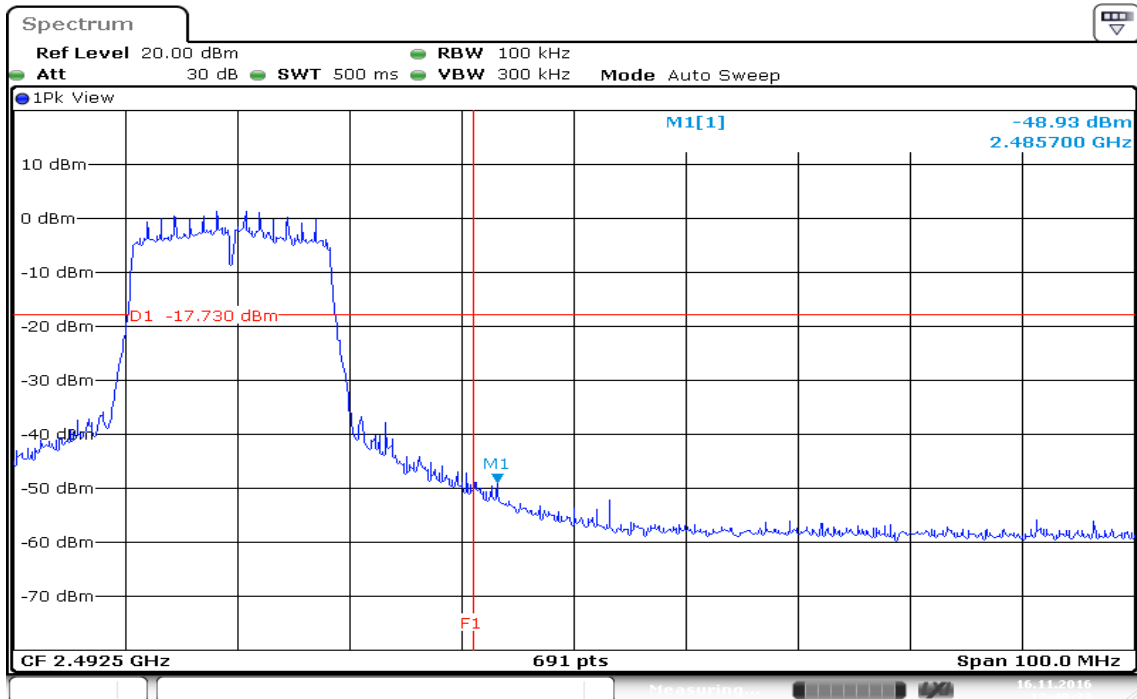
Mid CH_ Conducted spurious emission



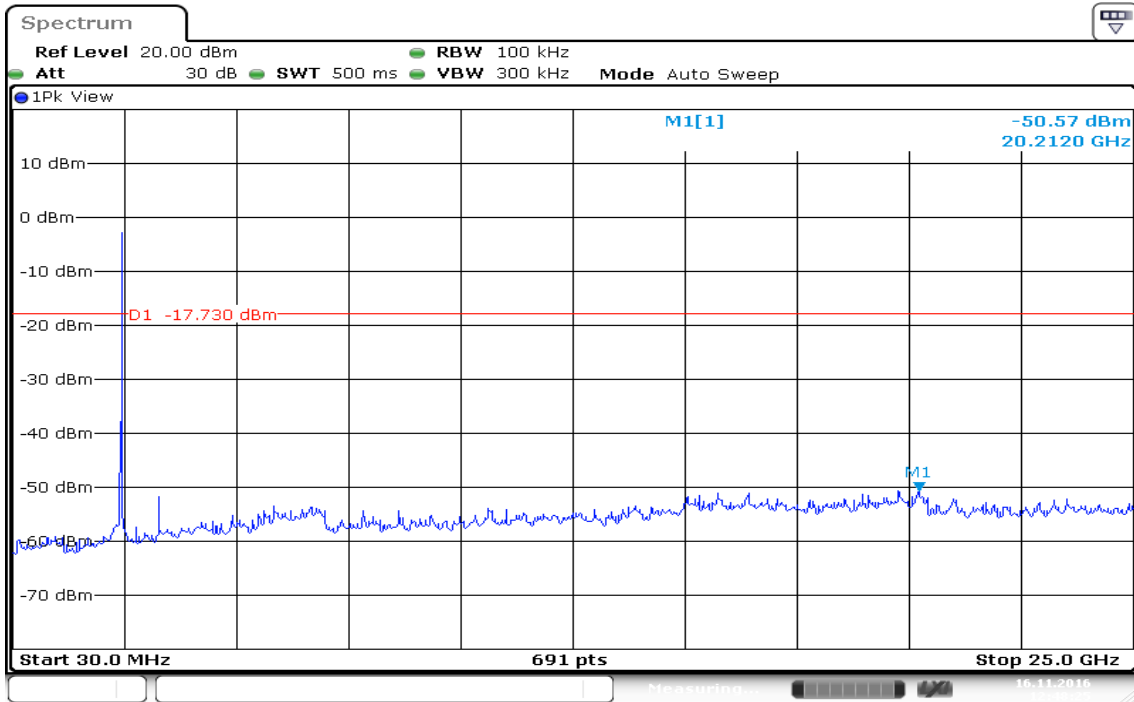
High CH_100kHz PSD reference Level



High CH_Conducted Band edge



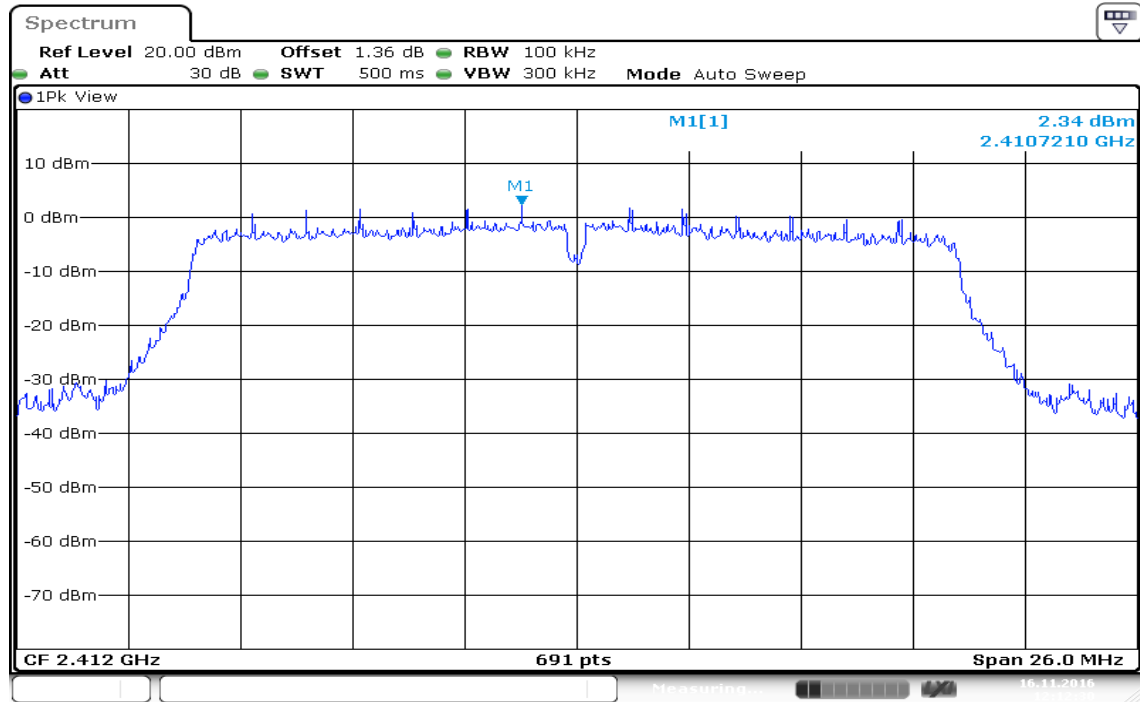
High CH_ Conducted spurious emission



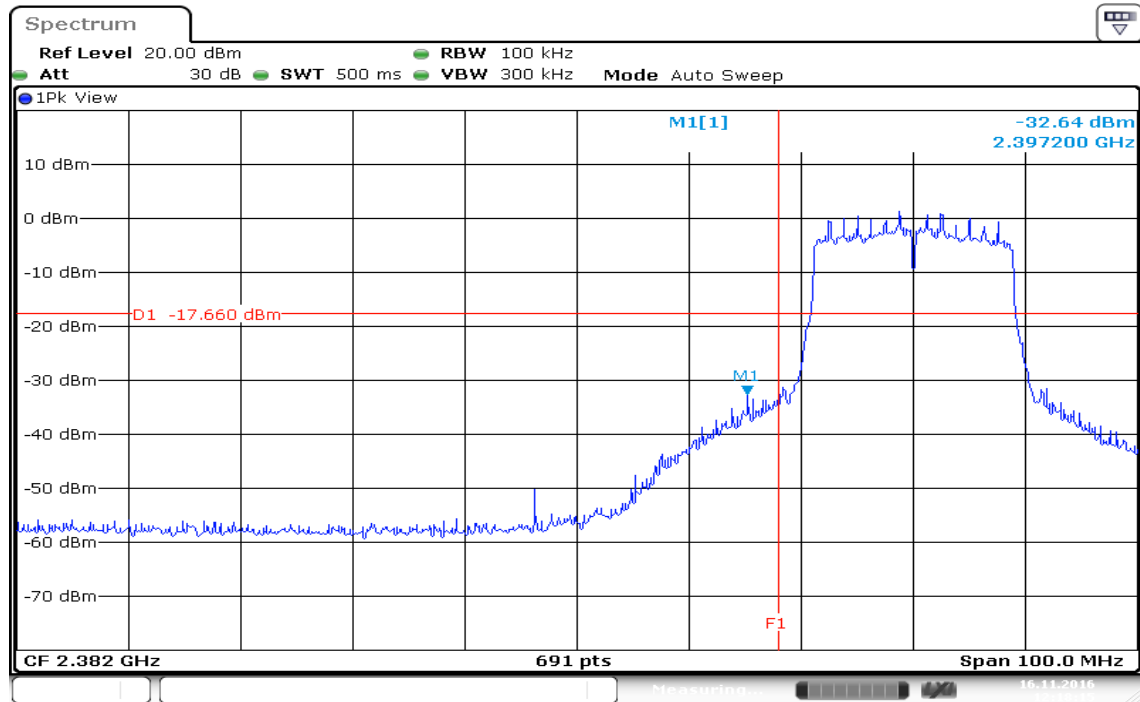
Date: 16 NOV 2016 12:48:26

Mode: IEEE 802.11n HT20 / chain 1

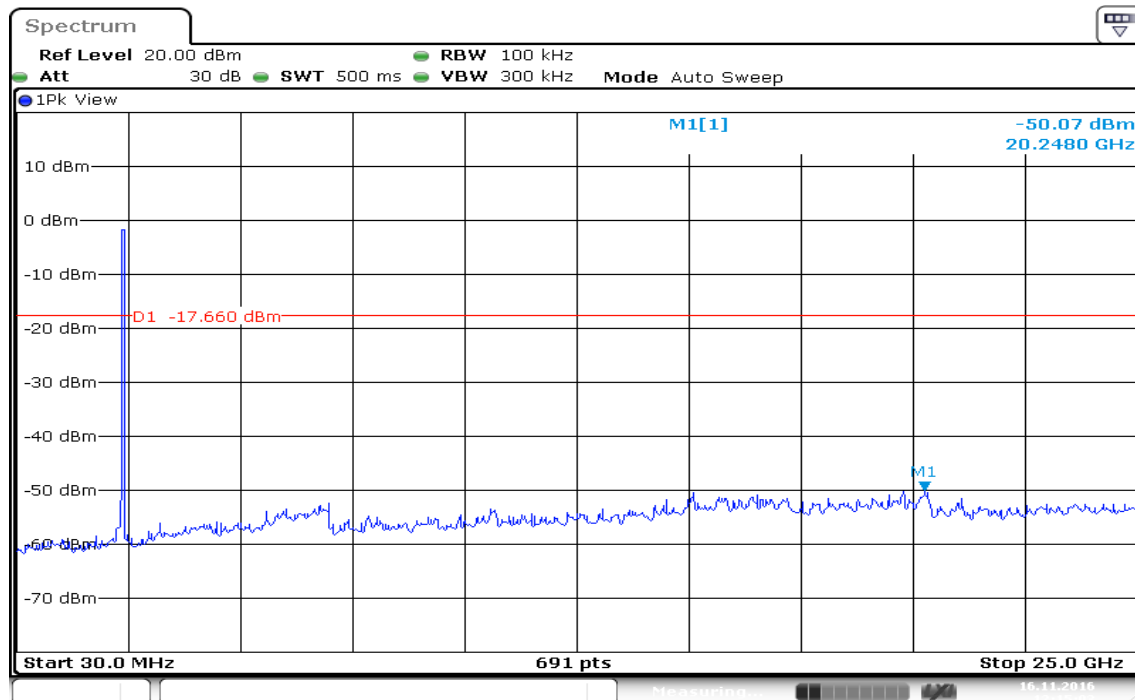
Low CH_100kHz PSD reference Level



Low CH_Conducted Band edge

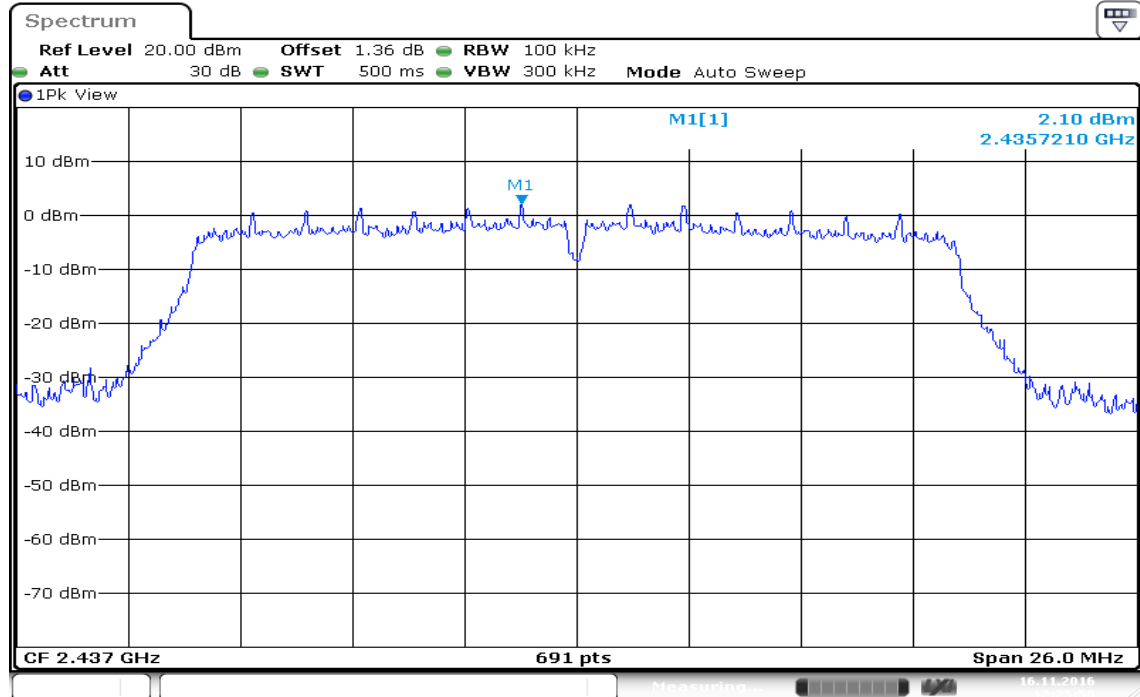


Low CH_Conducted spurious emission



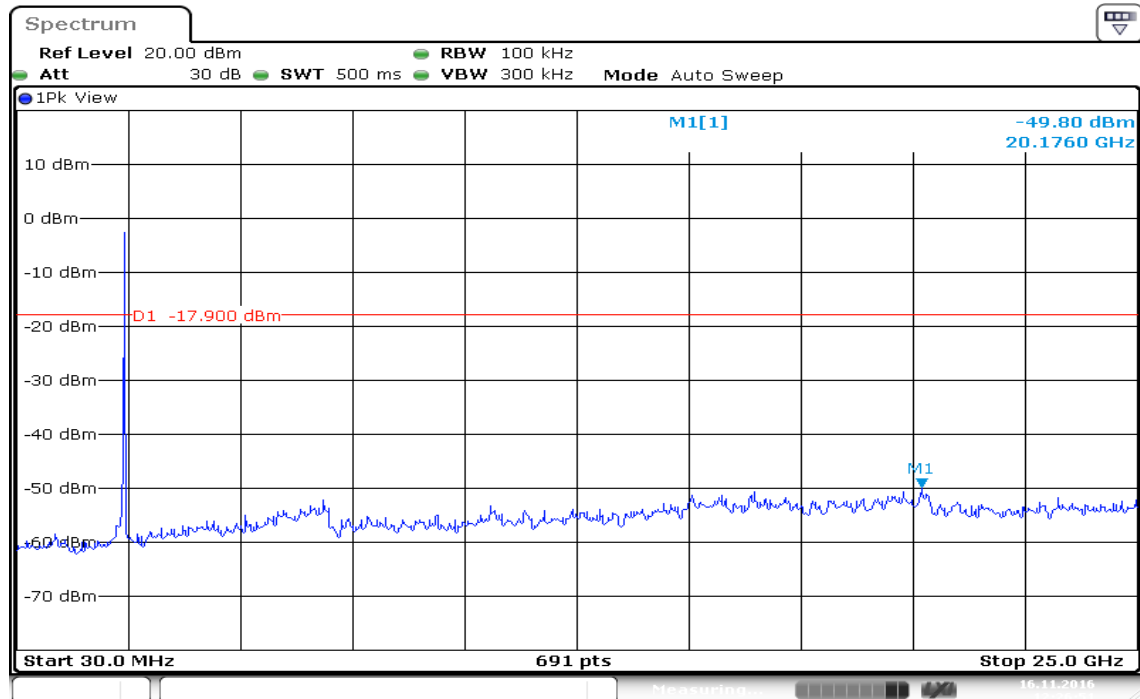
Date: 16 NOV 2016 12:15:03

Mid CH_100kHz PSD reference Level



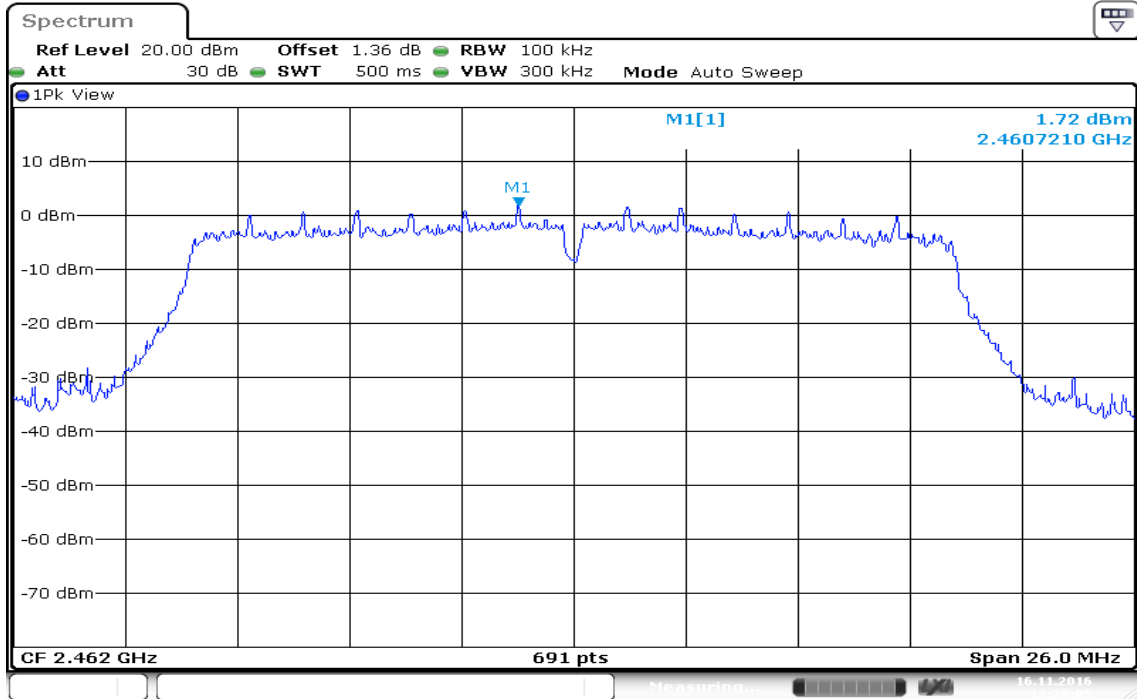
Date: 16 NOV 2016 12:25:50

Mid CH_ Conducted spurious emission

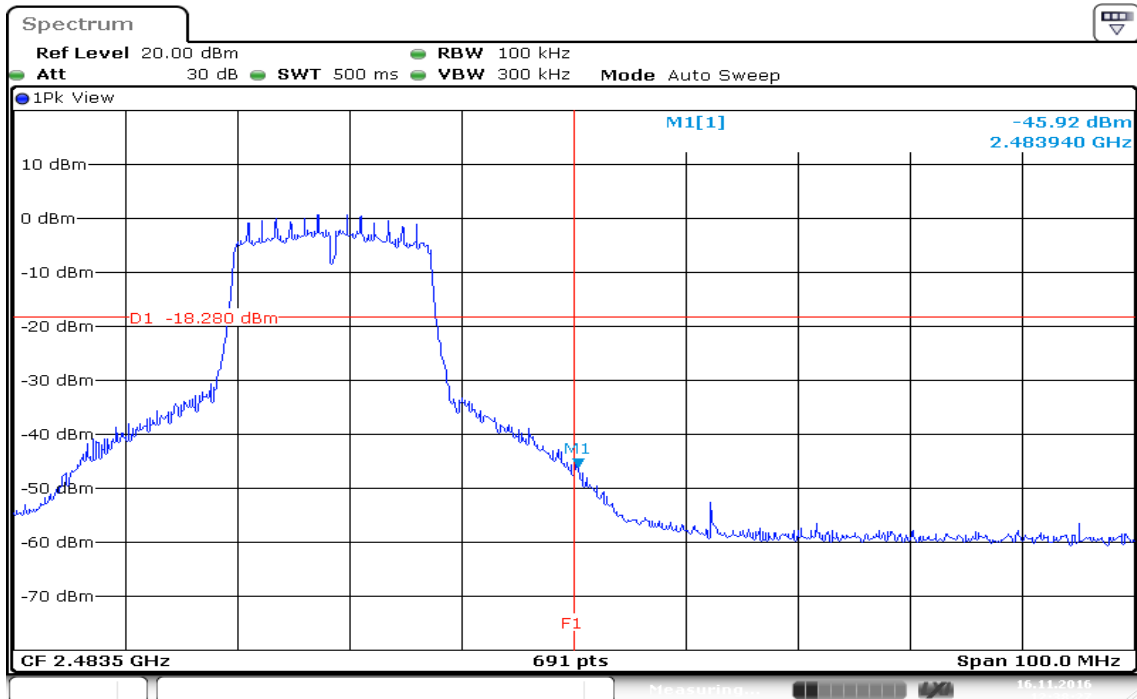


Date: 16 NOV 2016 12:26:52

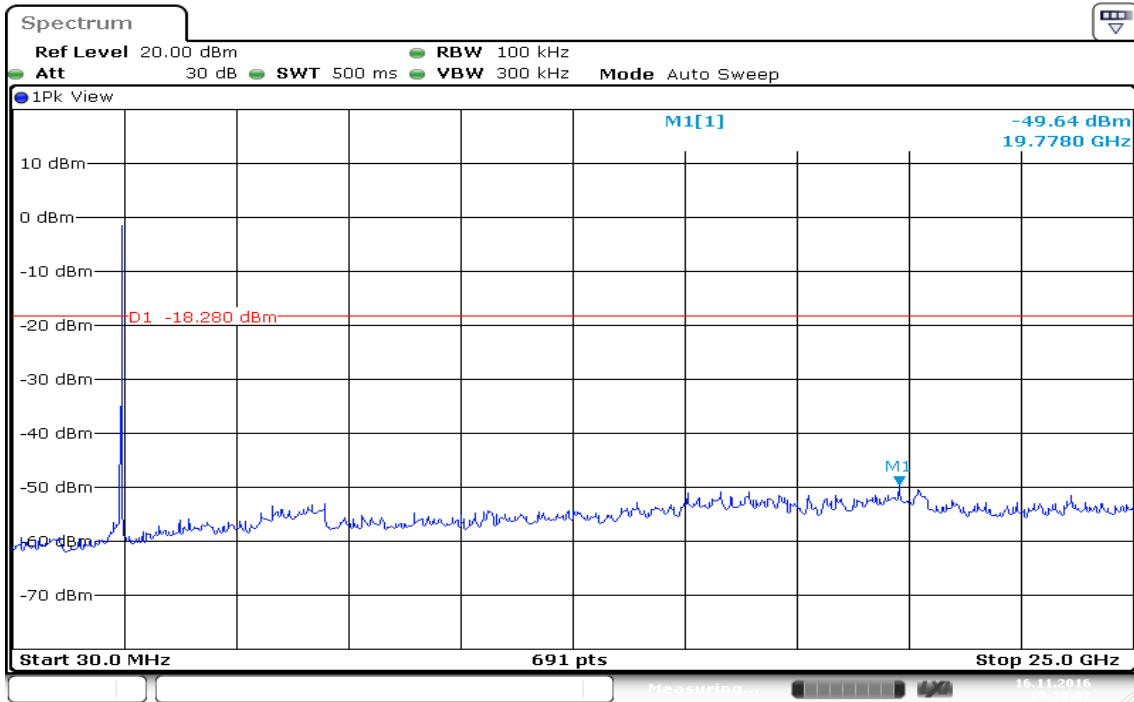
High CH_100kHz PSD reference Level



High CH_Conducted Band edge



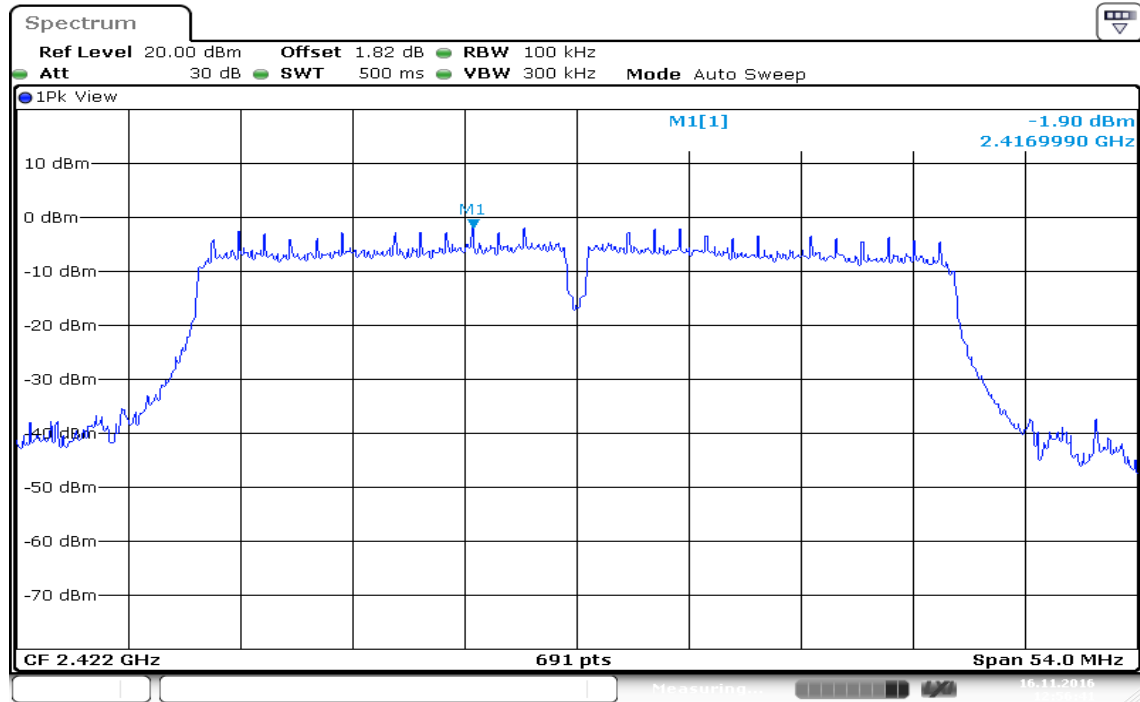
High CH_ Conducted spurious emission



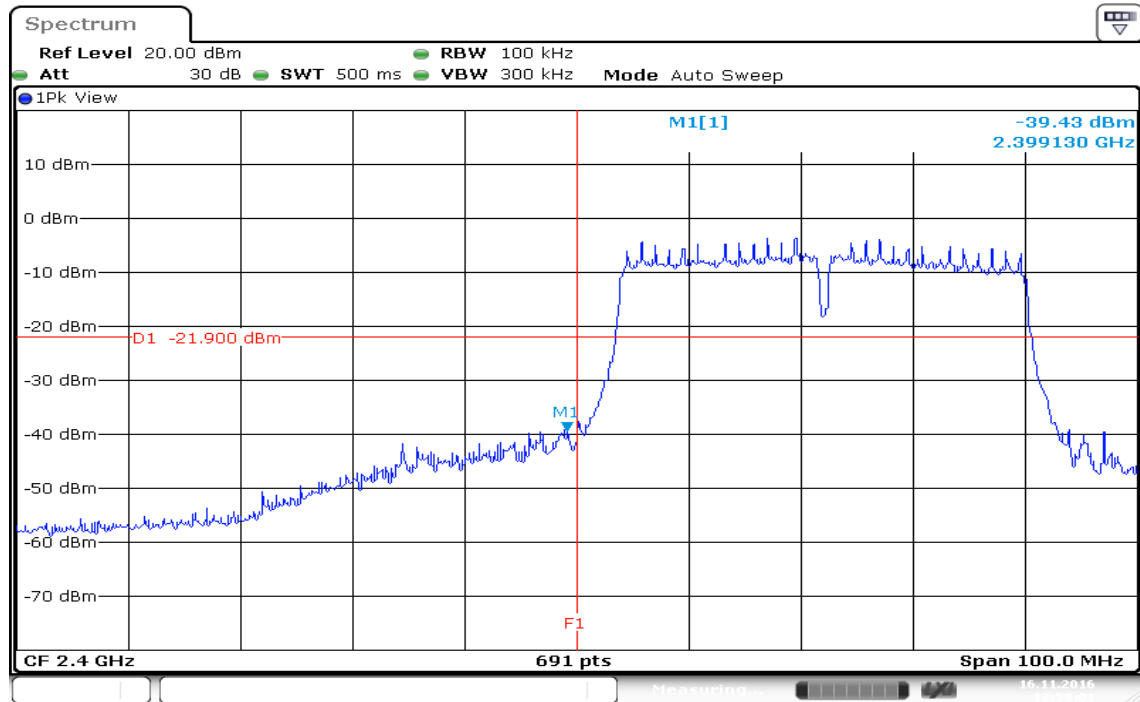
Date: 16.NOV.2016 12:29:07

Mode: IEEE 802.11n HT40 / chain 0

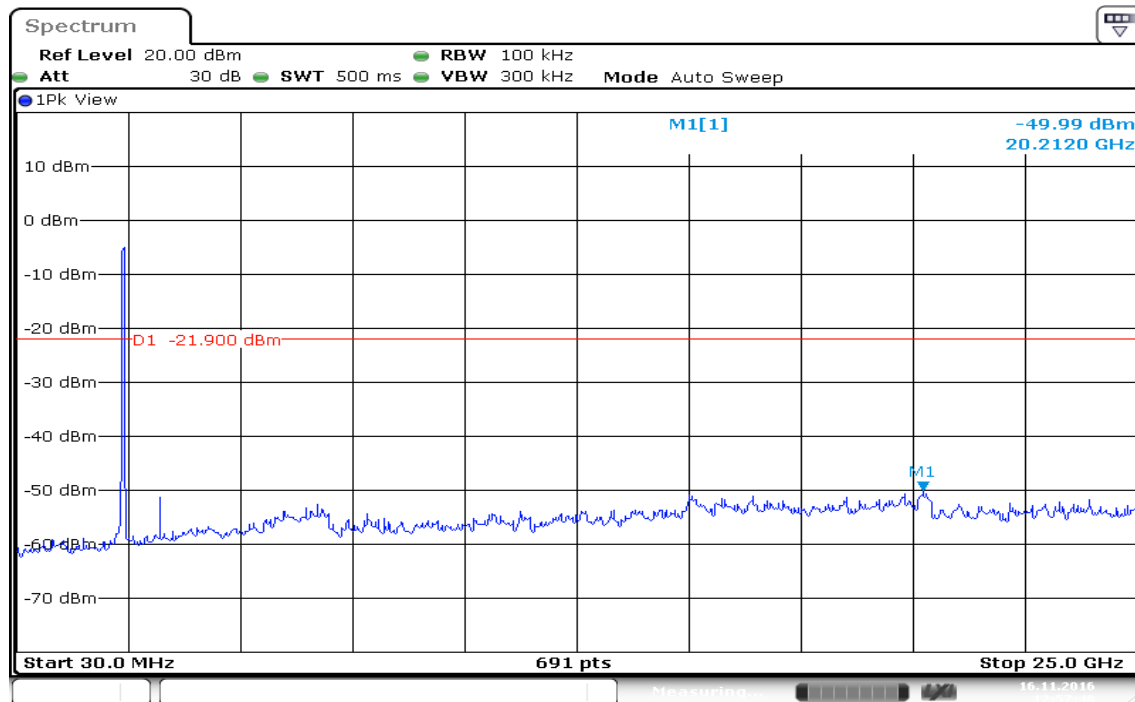
Low CH_100kHz PSD reference Level



Low CH_Conducted Band edge

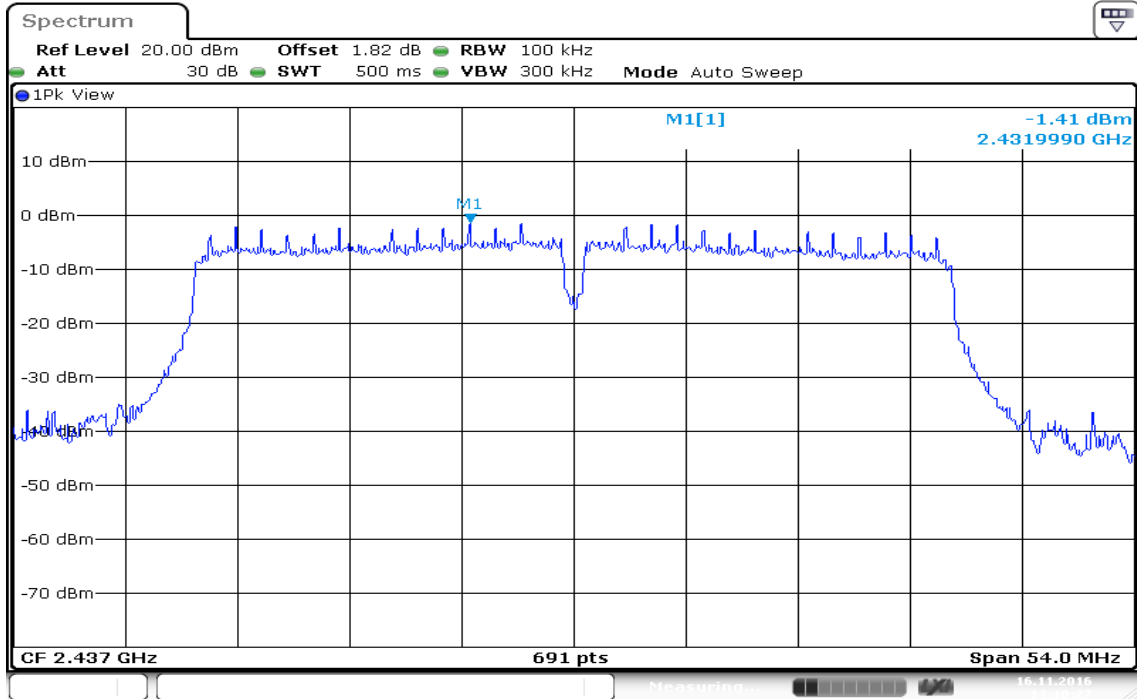


Low CH_Conducted spurious emission



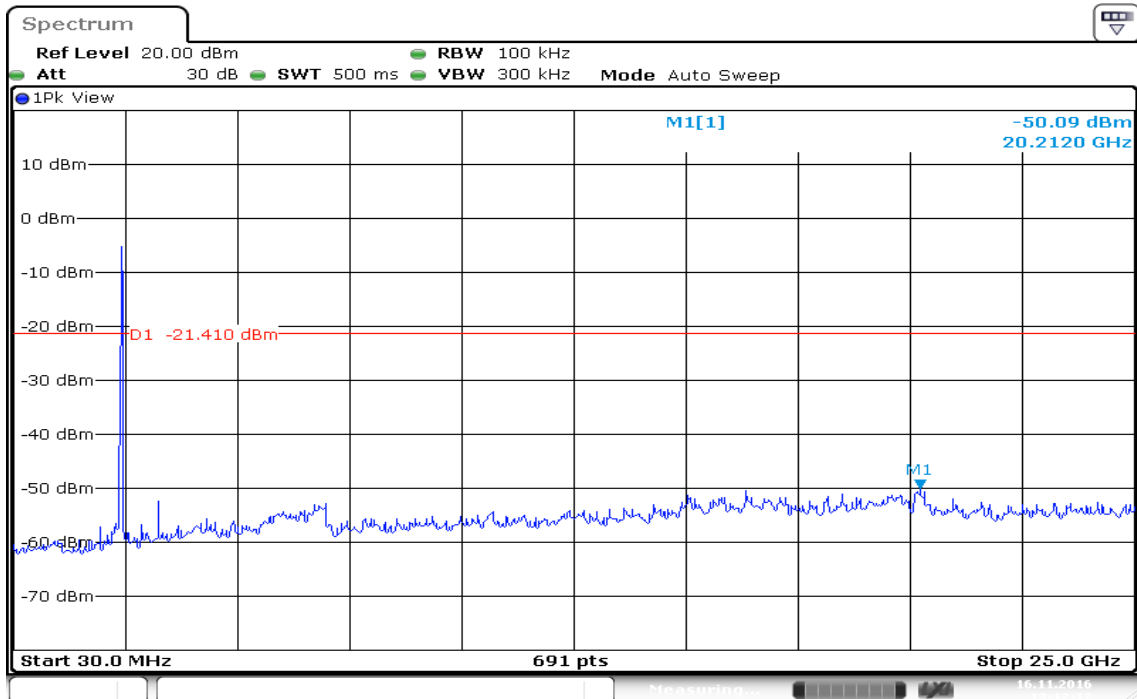
Date: 16 NOV 2016 12:57:48

Mid CH_100kHz PSD reference Level



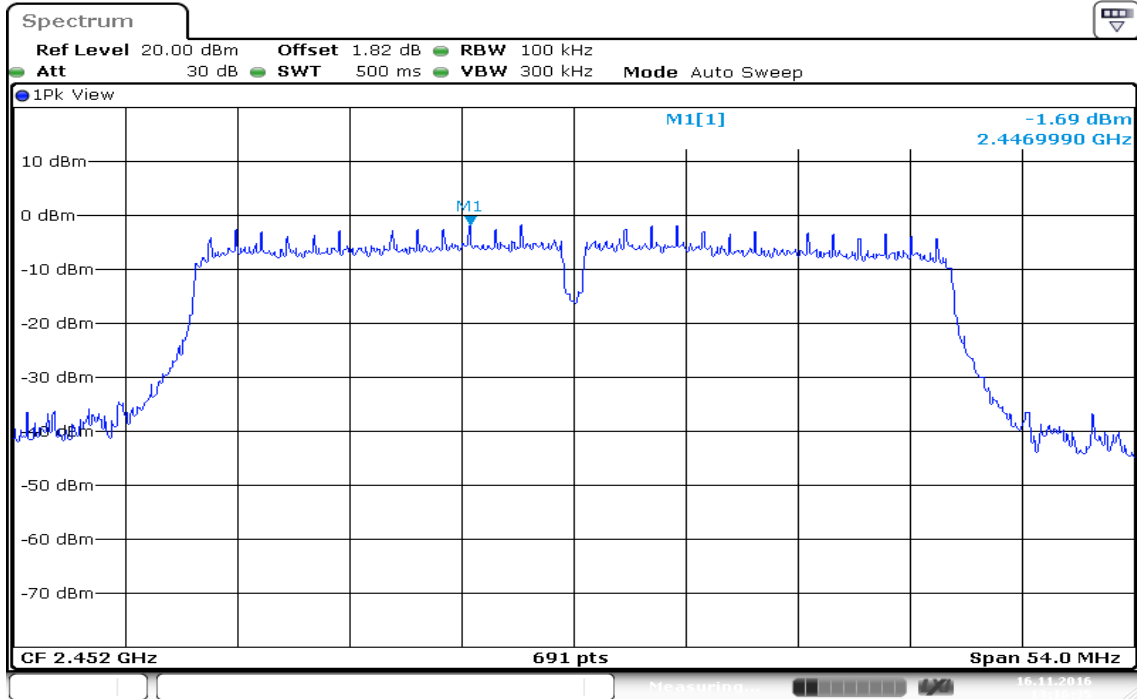
Date:16 NOV 2016 13:10:27

Mid CH_ Conducted spurious emission



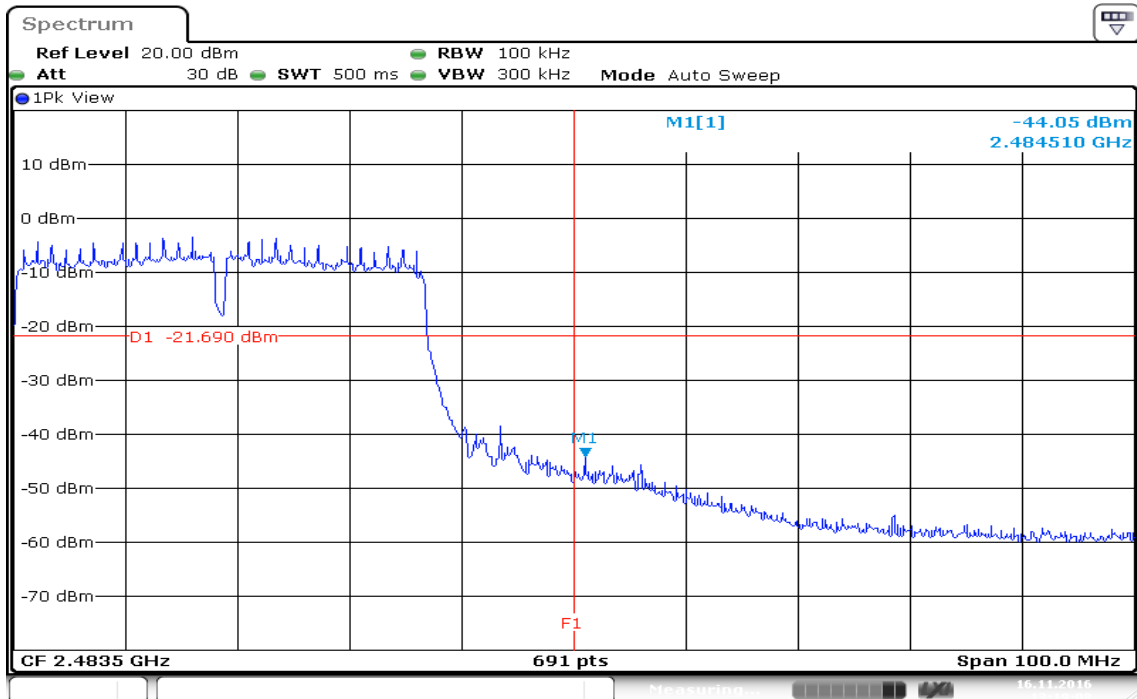
Date:16 NOV 2016 13:12:12

High CH_100kHz PSD reference Level



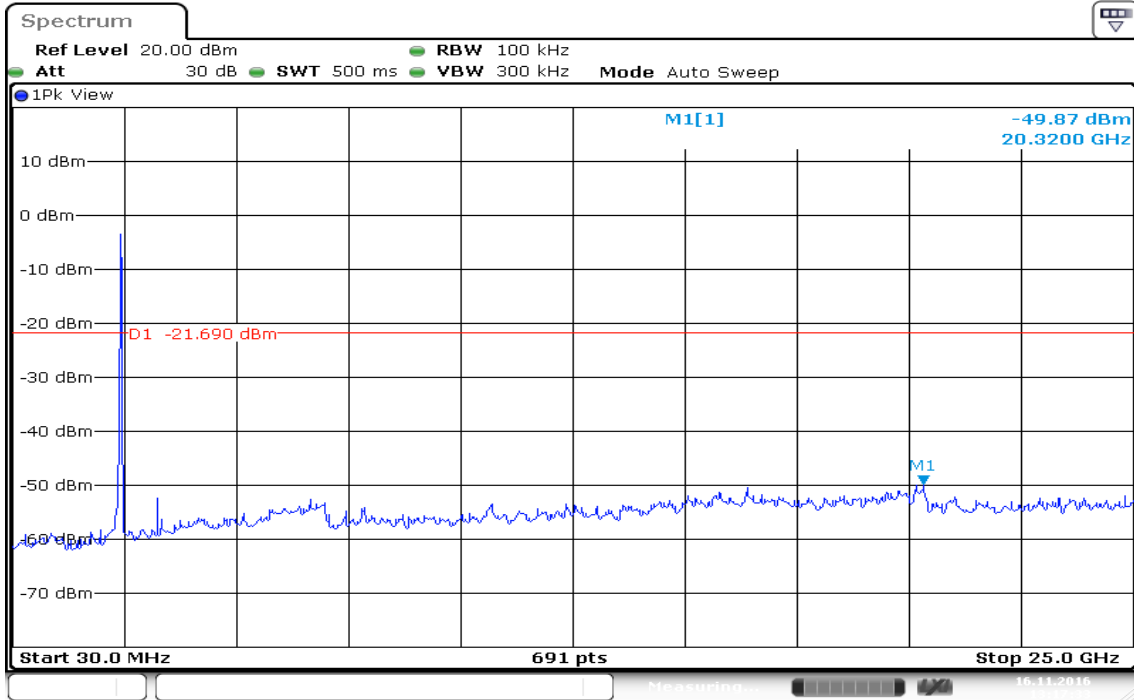
Date: 16 NOV 2016 13:16:35

High CH_Conducted Band edge



Date: 16 NOV 2016 13:19:08

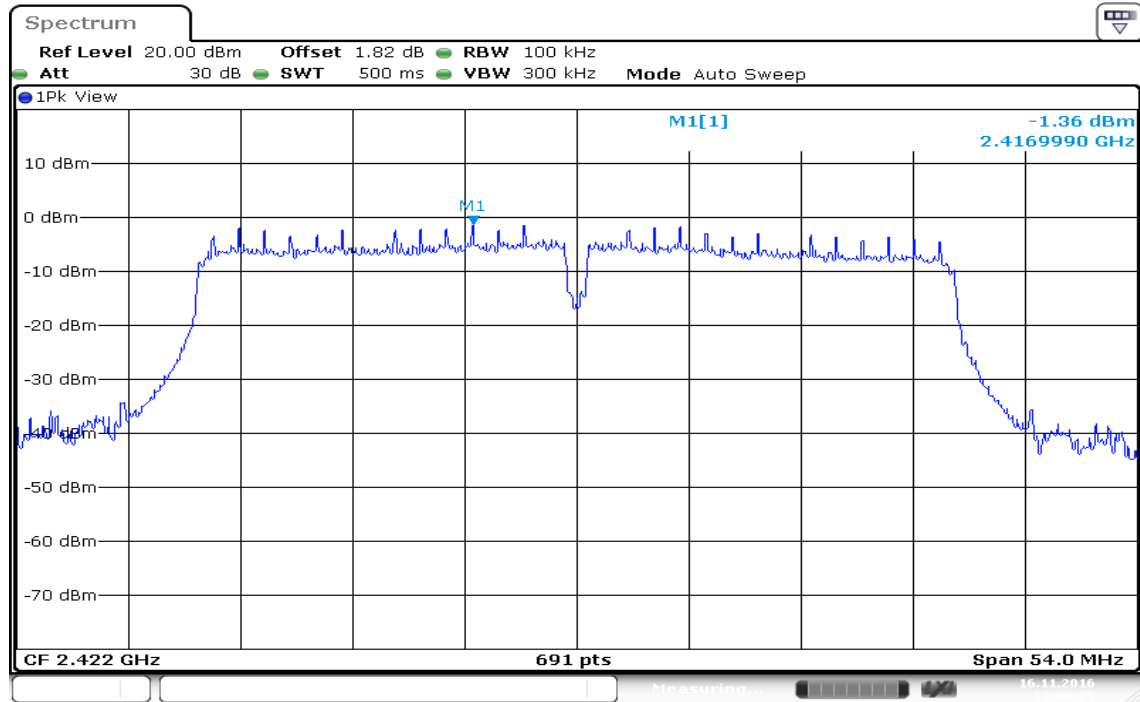
High CH_ Conducted spurious emission



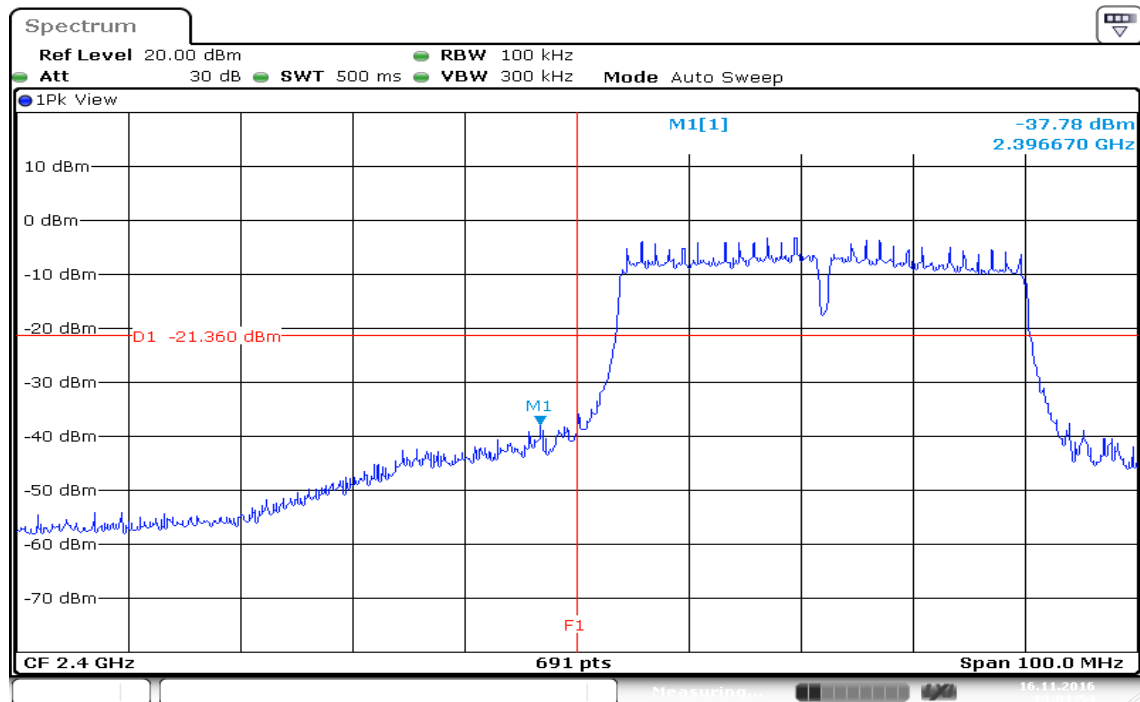
Date: 16.NOV.2016 13:17:33

Mode: IEEE 802.11n HT40 / chain 1

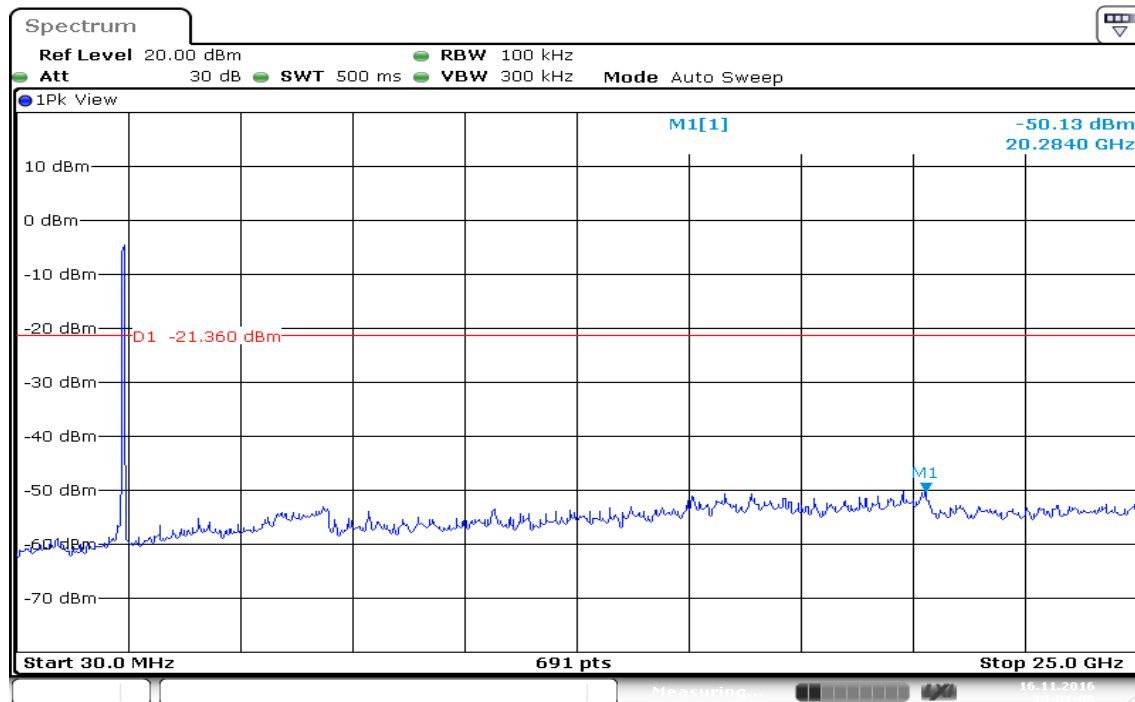
Low CH_100kHz PSD reference Level



Low CH_Conducted Band edge

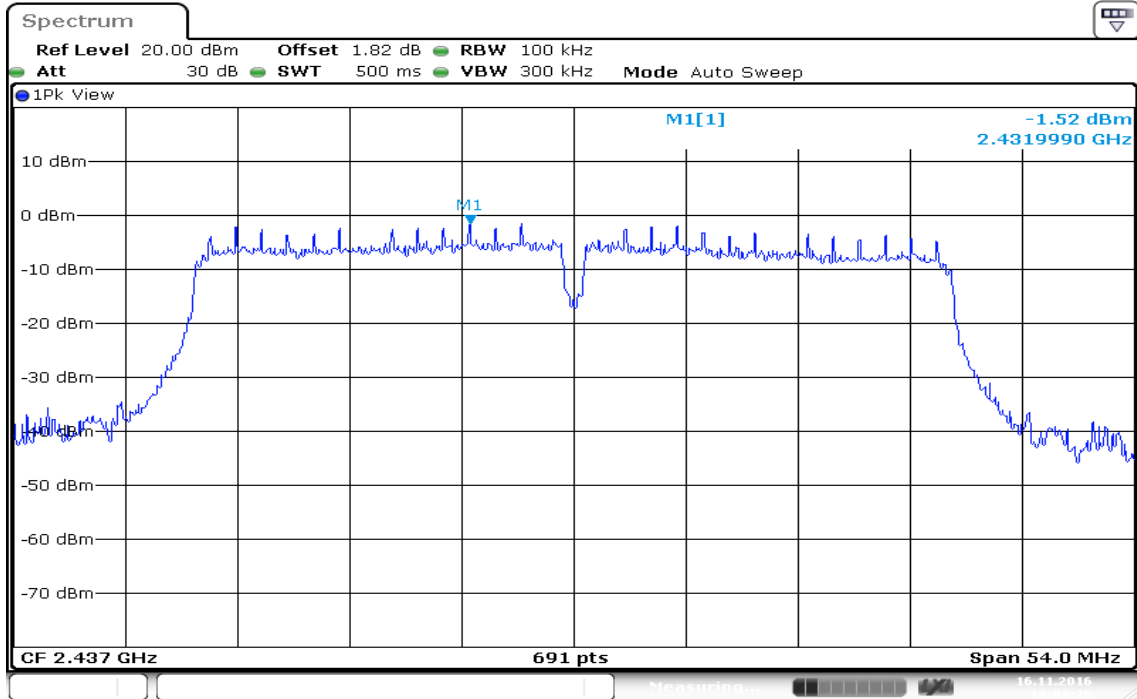


Low CH_Conducted spurious emission

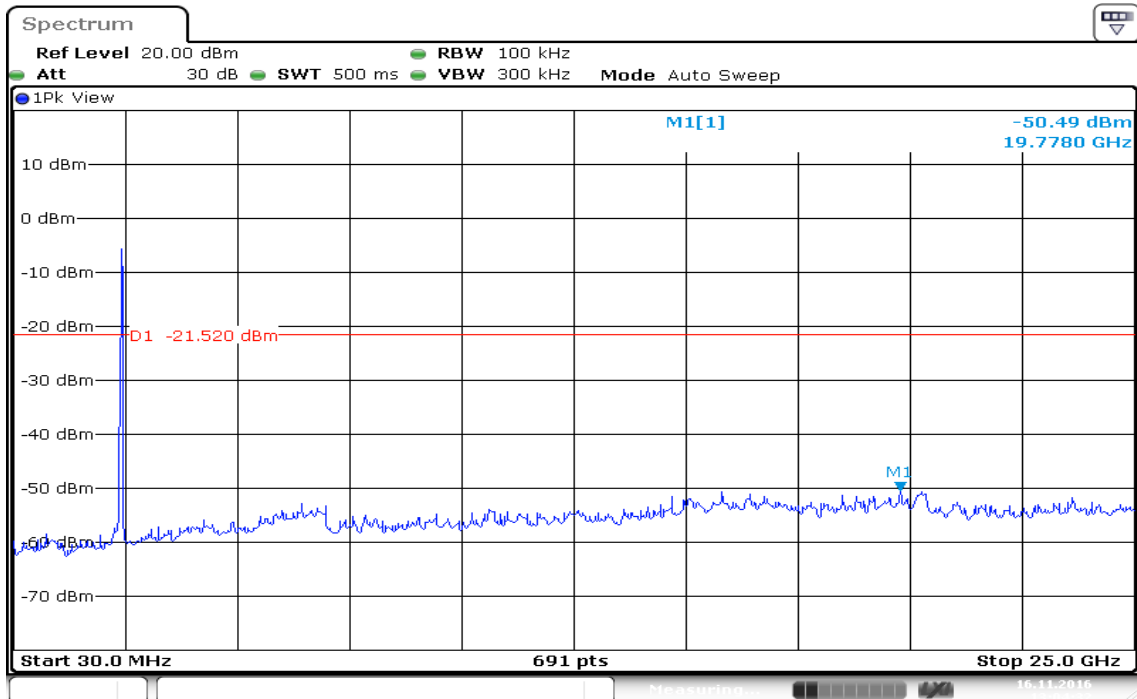


Date: 16 NOV 2016 13:01:09

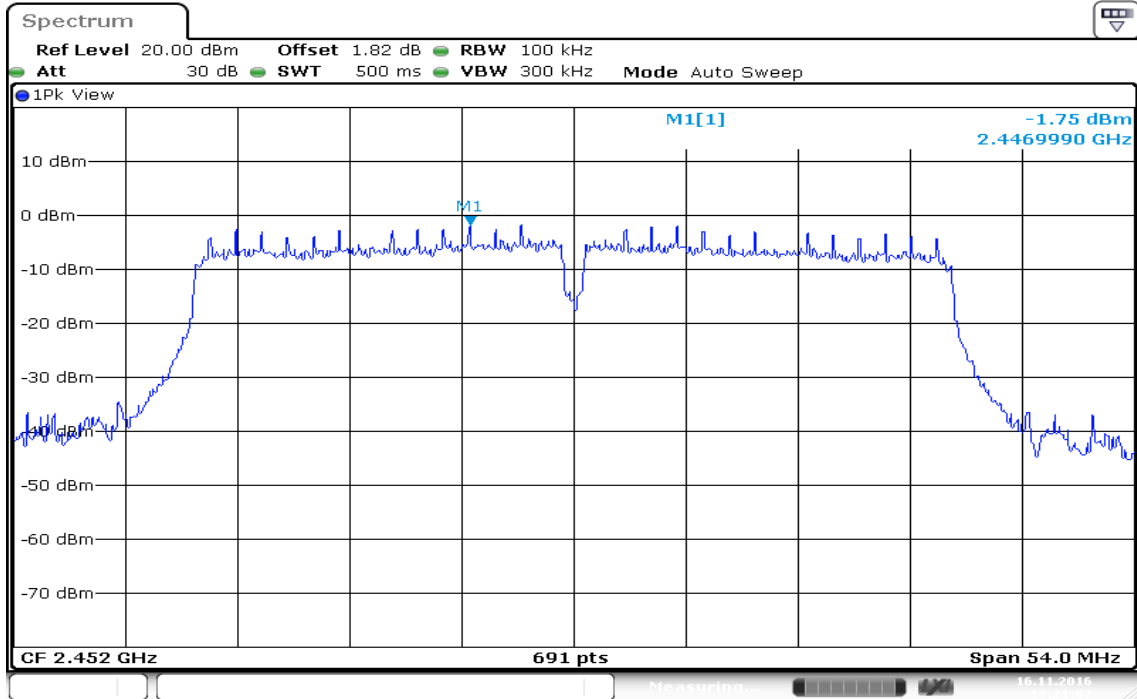
Mid CH_100kHz PSD reference Level



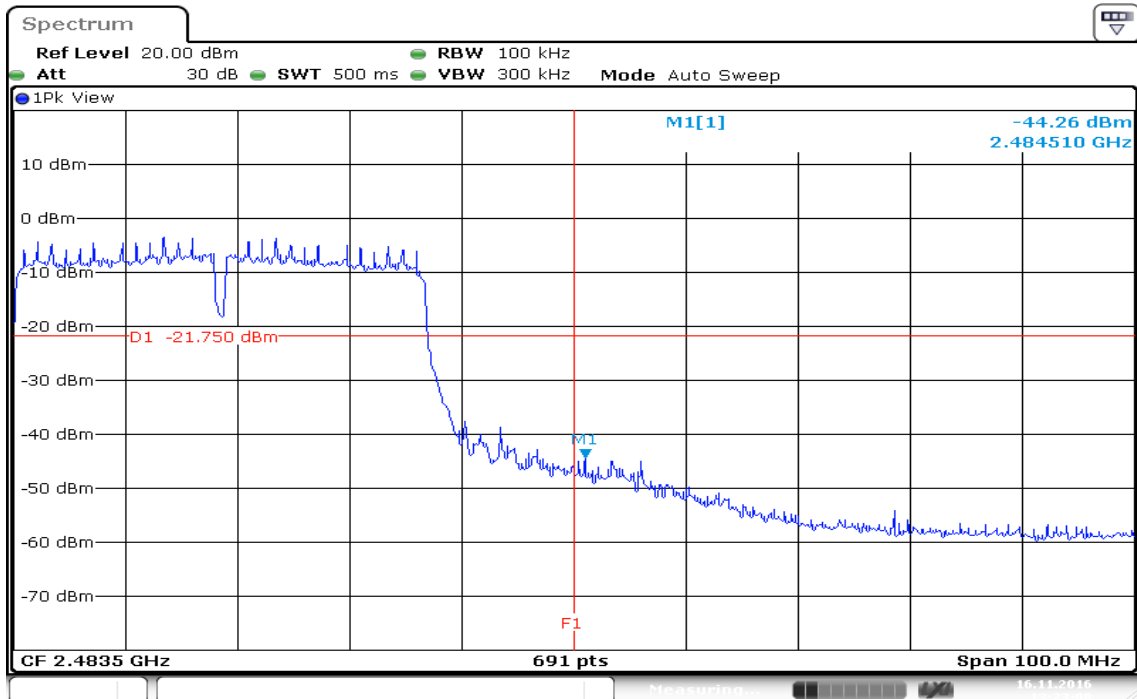
Mid CH_ Conducted spurious emission



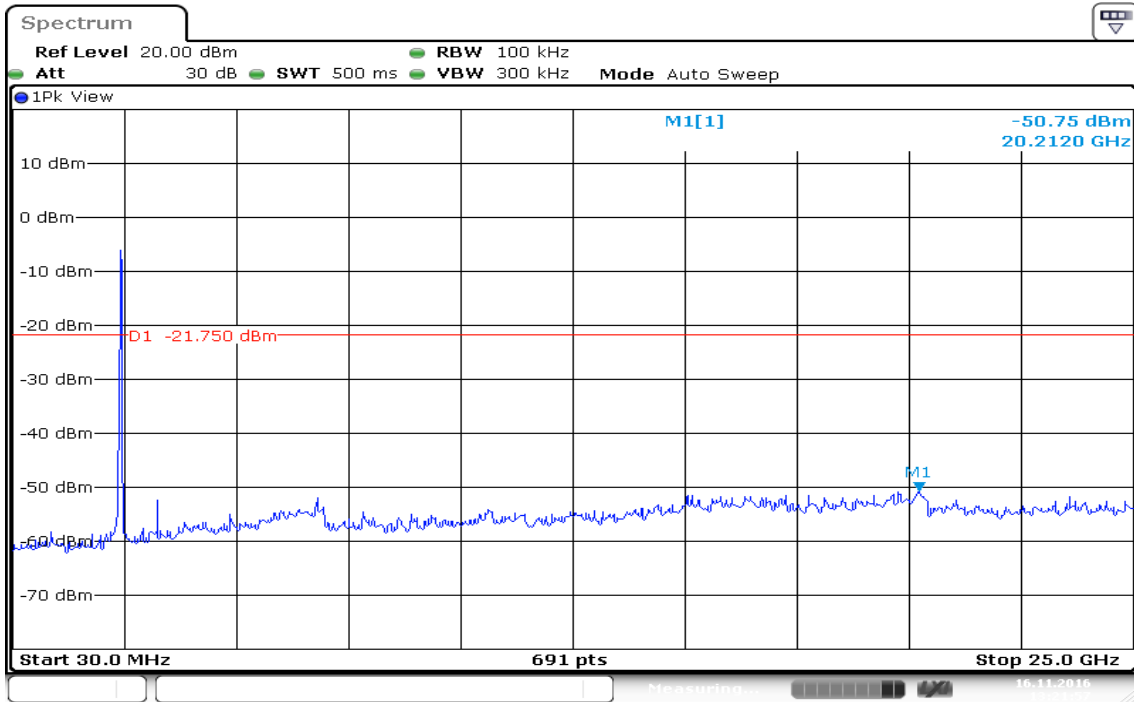
High CH_100kHz PSD reference Level



High CH_Conducted Band edge



High CH_ Conducted spurious emission



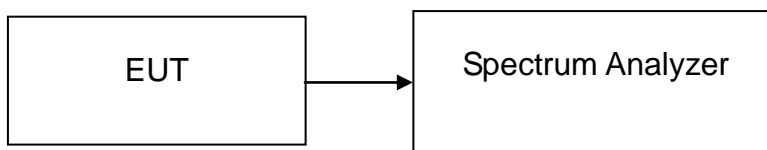
Date: 16 NOV 2016 13:21:58

7.6 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e) & RSS-247, for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f) & RSS-247, the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 30 kHz, Detector = Peak
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

Test Data

IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.87	8.00	PASS
Mid	2437	-8.25		PASS
High	2462	-8.20		PASS

IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.06	8.00	PASS
Mid	2437	-10.03		PASS
High	2462	-10.05		PASS

IEEE 802.11n HT 20 MHz mode

Channel	Frequency (MHz)	Chain 0 PPSS (dBm)	Chain 1 PPSS (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-8.36	-8.02	-5.18	8.00	PASS
Mid	2437	-8.83	-9.28	-6.04		PASS
High	2462	-8.82	-9.44	-6.11		PASS

IEEE 802.11n HT 40 MHz mode

Channel	Frequency (MHz)	Chain 0 PPSS (dBm)	Chain 1 PPSS (dBm)	PPSD (dBm)	Limit (dBm)	Result
Low	2422	-10.60	-10.68	-7.63	8.00	PASS
Mid	2437	-10.02	-10.61	-7.29		PASS
High	2452	-11.28	-11.46	-8.36		PASS

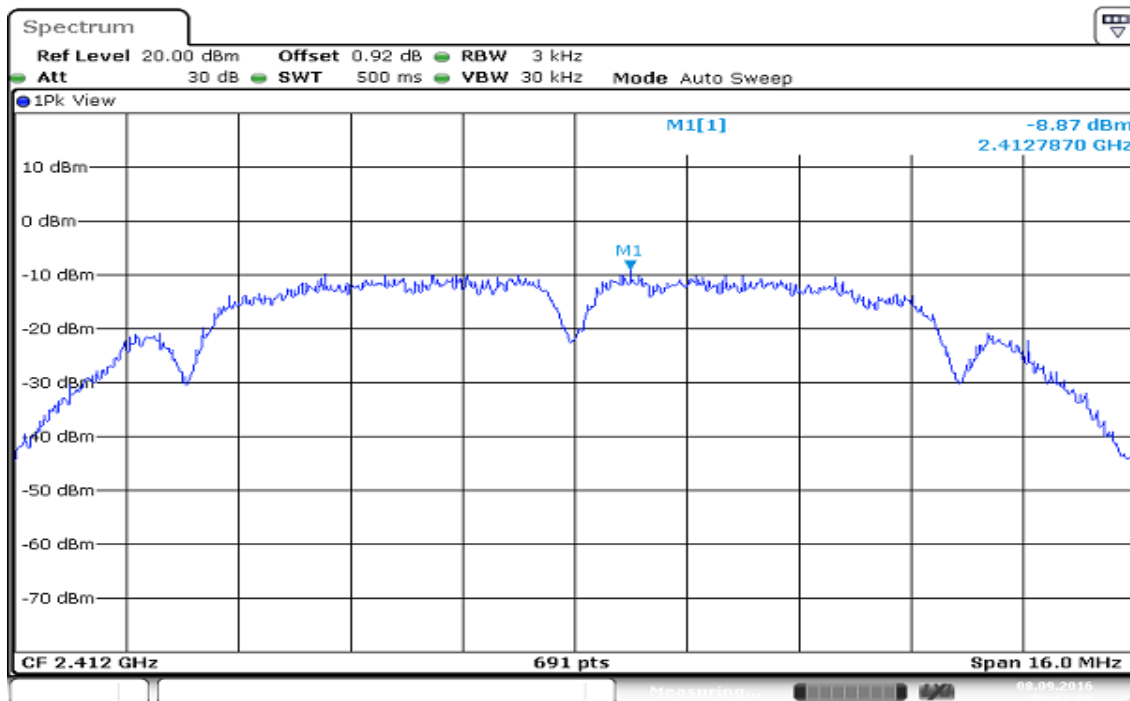
Remark:

1. Total PPSS (dBm) = 10*LOG(10^(Chain 0 PPSS / 10)+10^(Chain 1 PPSS / 10))

Test Plot

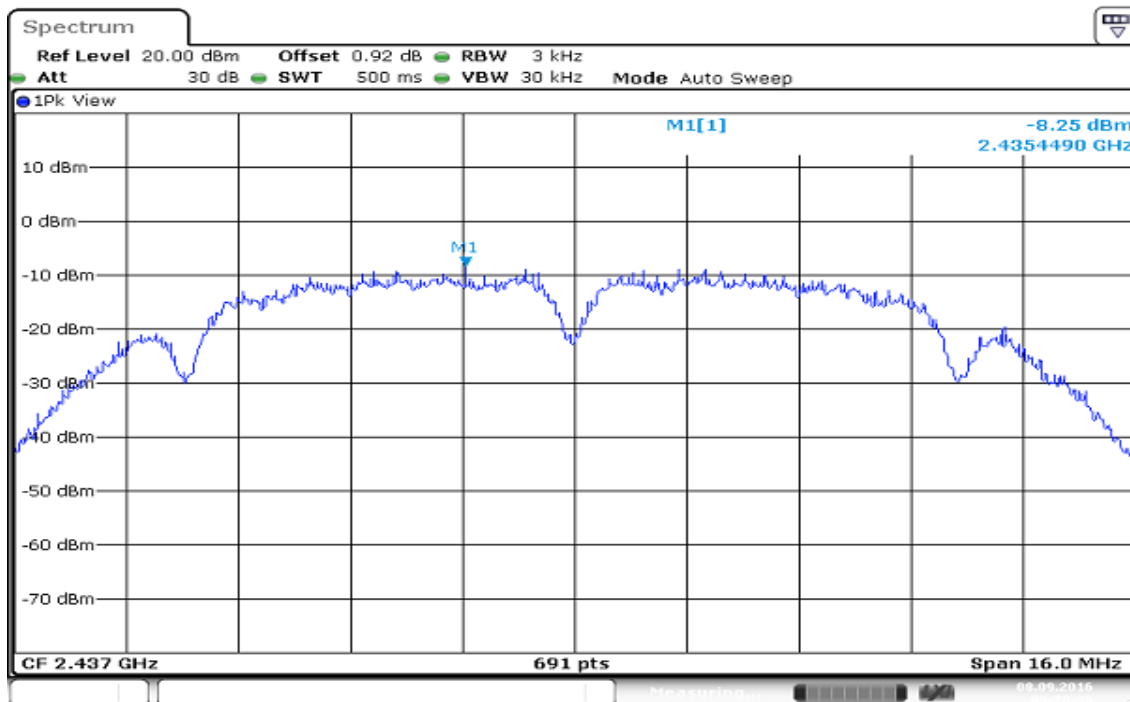
IEEE 802.11b mode

PPSD (CH Low)



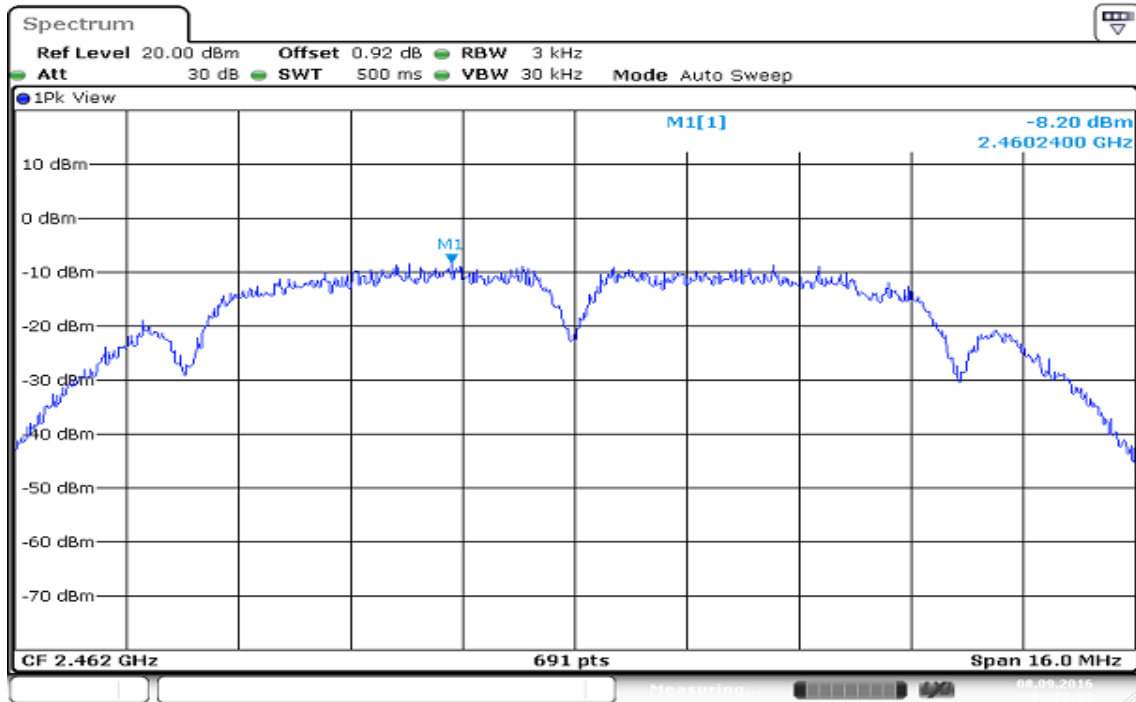
Date: 8 SEP 2016 09:17:09

PPSD (CH Mid)



Date: 8 SEP 2016 09:20:36

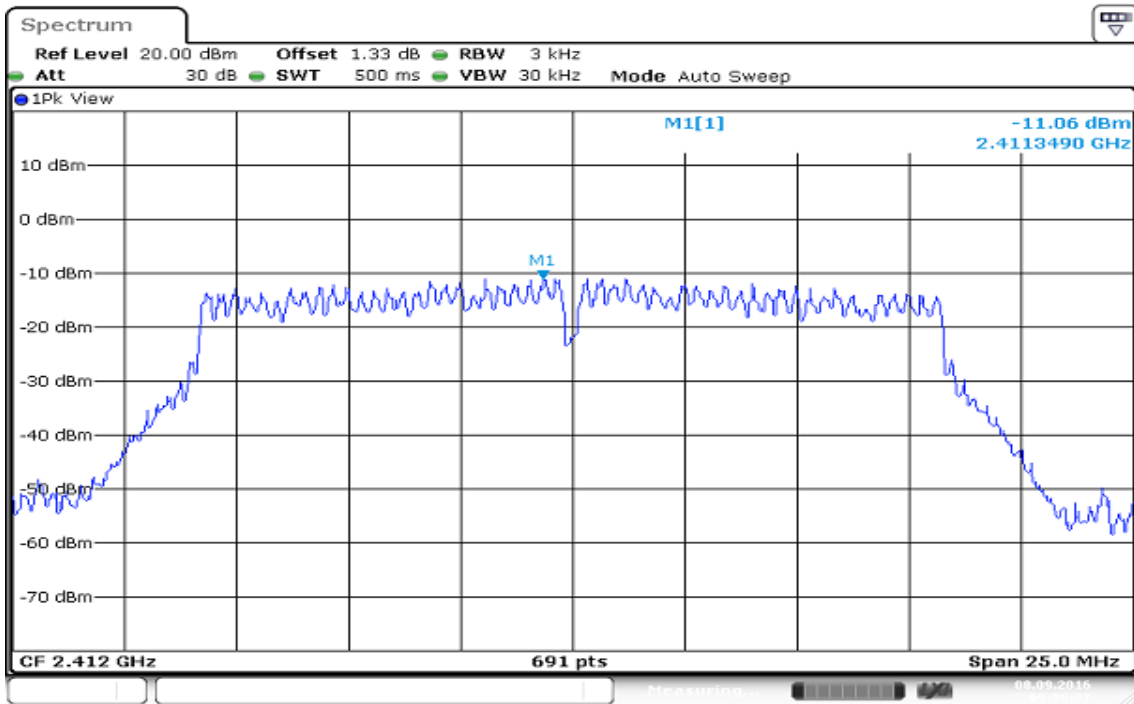
PPSD (CH High)



Date: 8 SEP 2016 09:22:33

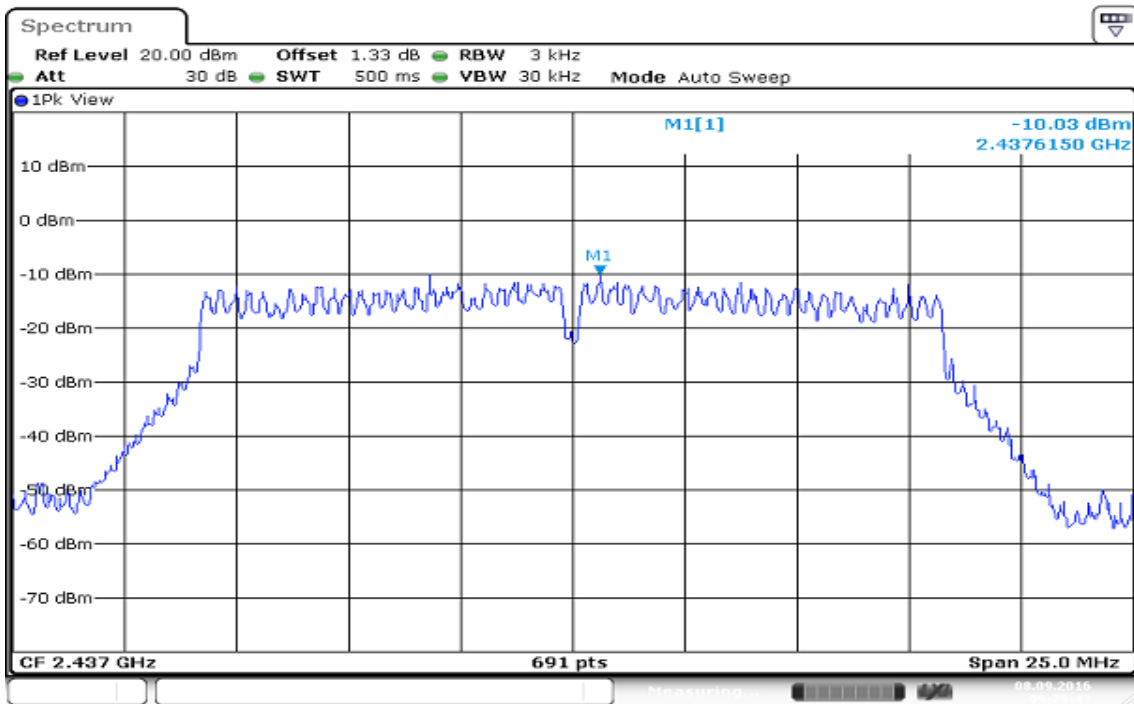
IEEE 802.11g mode

PPSD (CH Low)



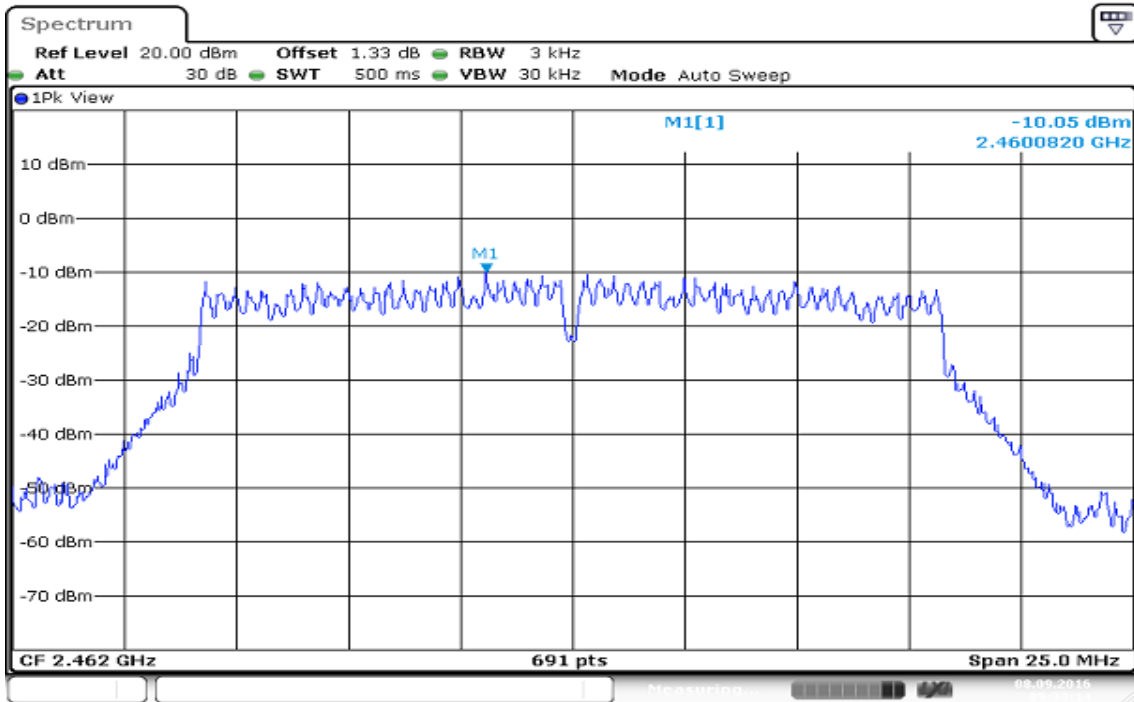
Date: 8 SEP 2016 09:26:28

PPSD (CH Mid)



Date: 8 SEP 2016 09:29:43

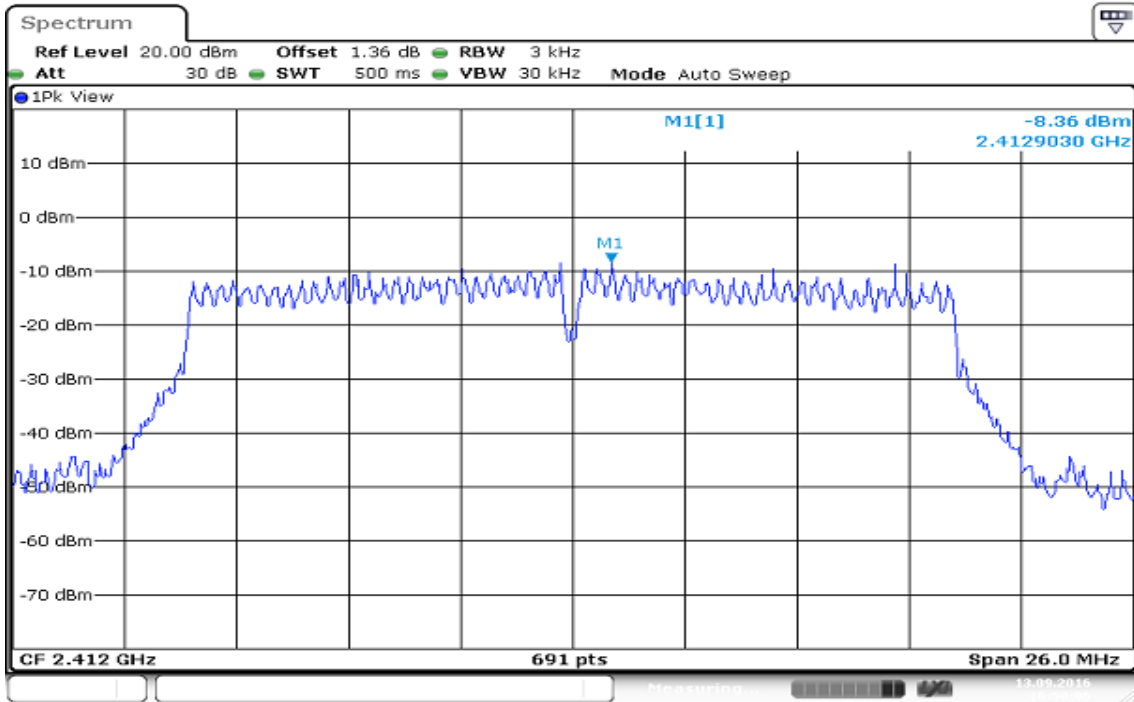
PPSD (CH High)



Date: 8 SEP 2016 09:33:14

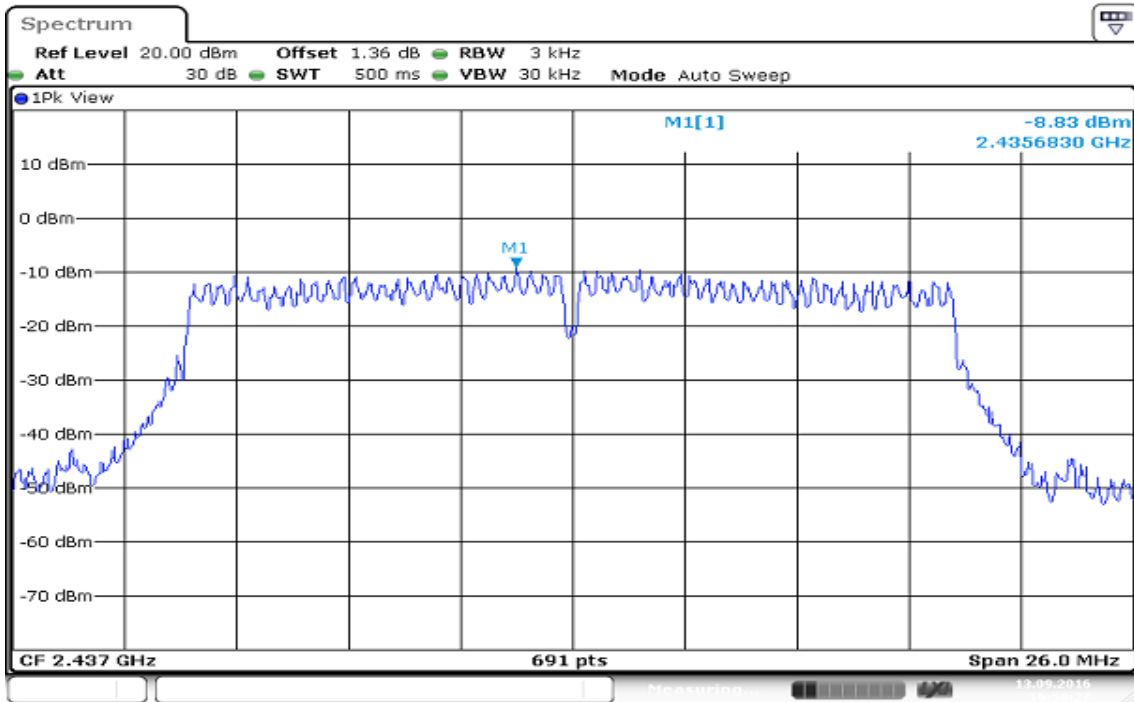
IEEE 802.11n HT 20 MHz mode / Chain 0

PPSD (CH Low)



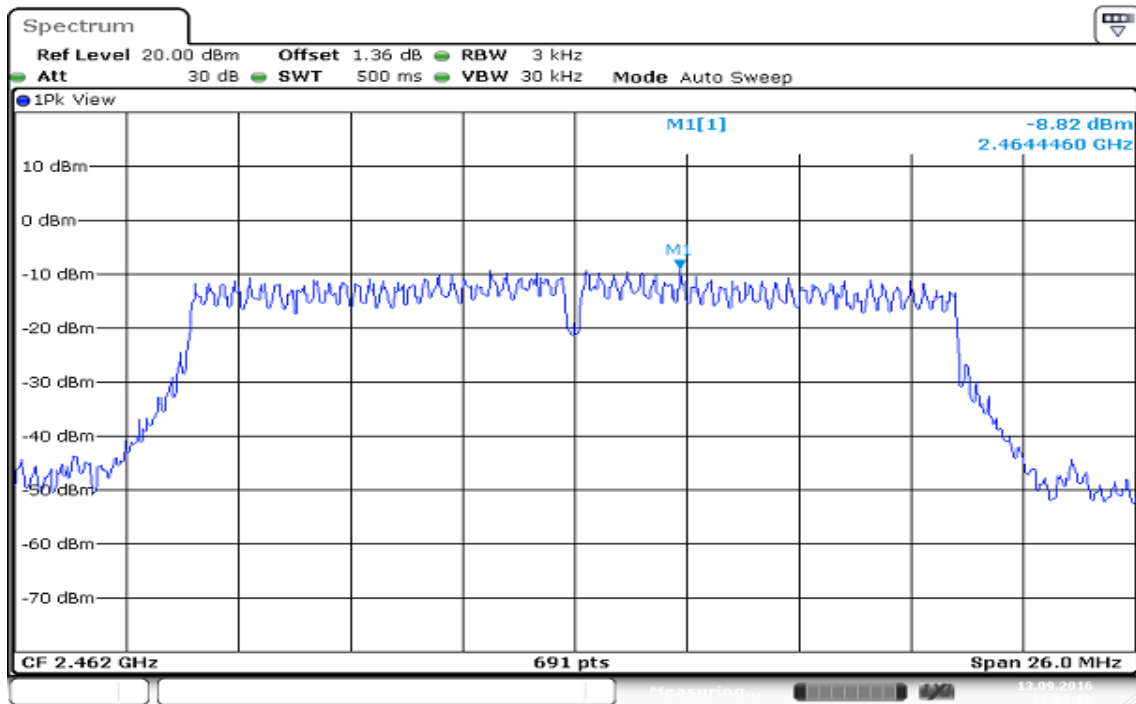
Date: 13 SEP 2016 16:50:07

PPSD (CH Mid)



Date: 13 SEP 2016 16:58:28

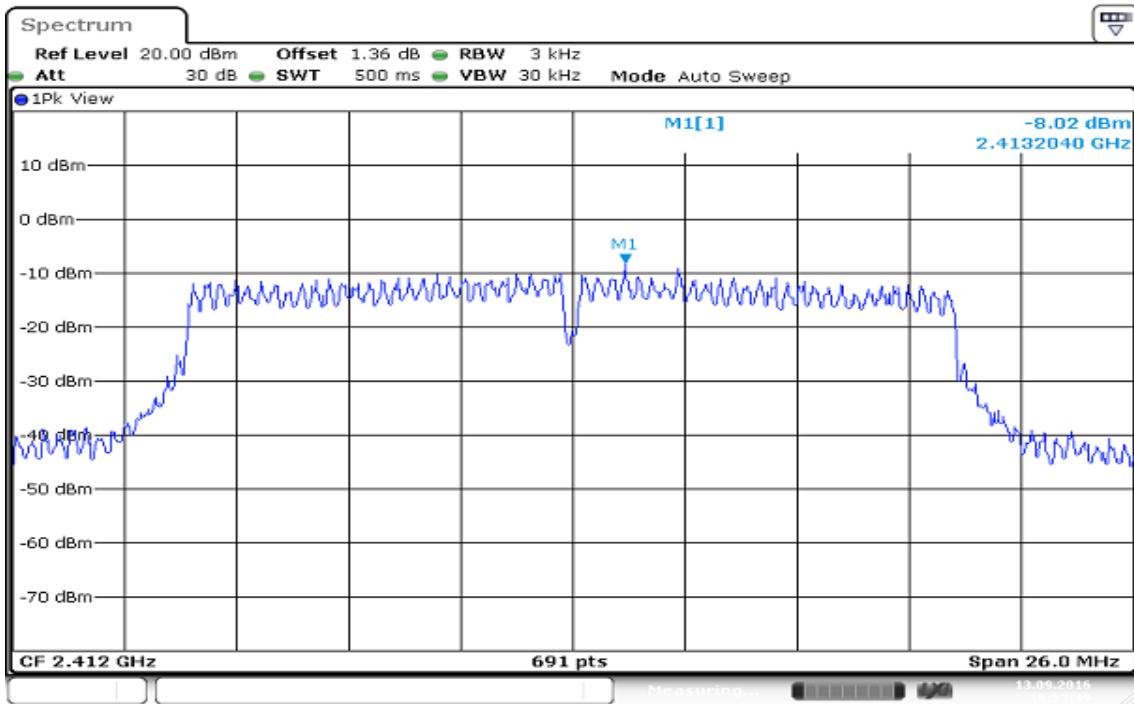
PPSD (CH High)



Date: 13 SEP 2016 17:01:07

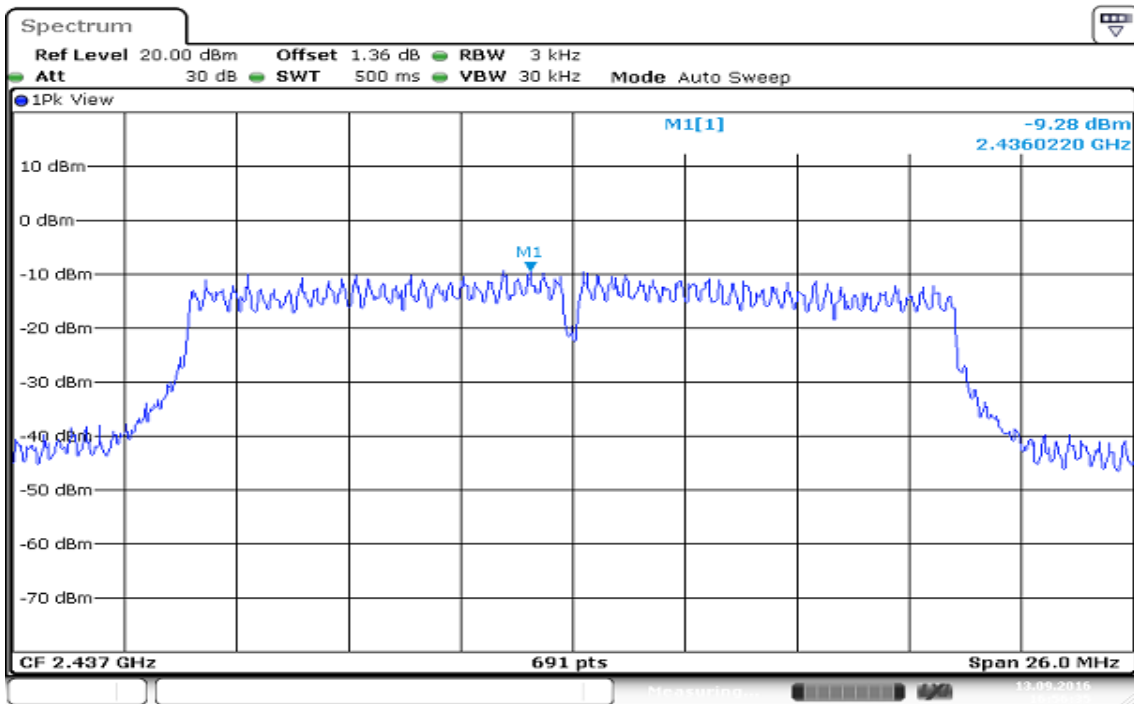
IEEE 802.11n HT 20 MHz mode / Chain 1

PPSD (CH Low)



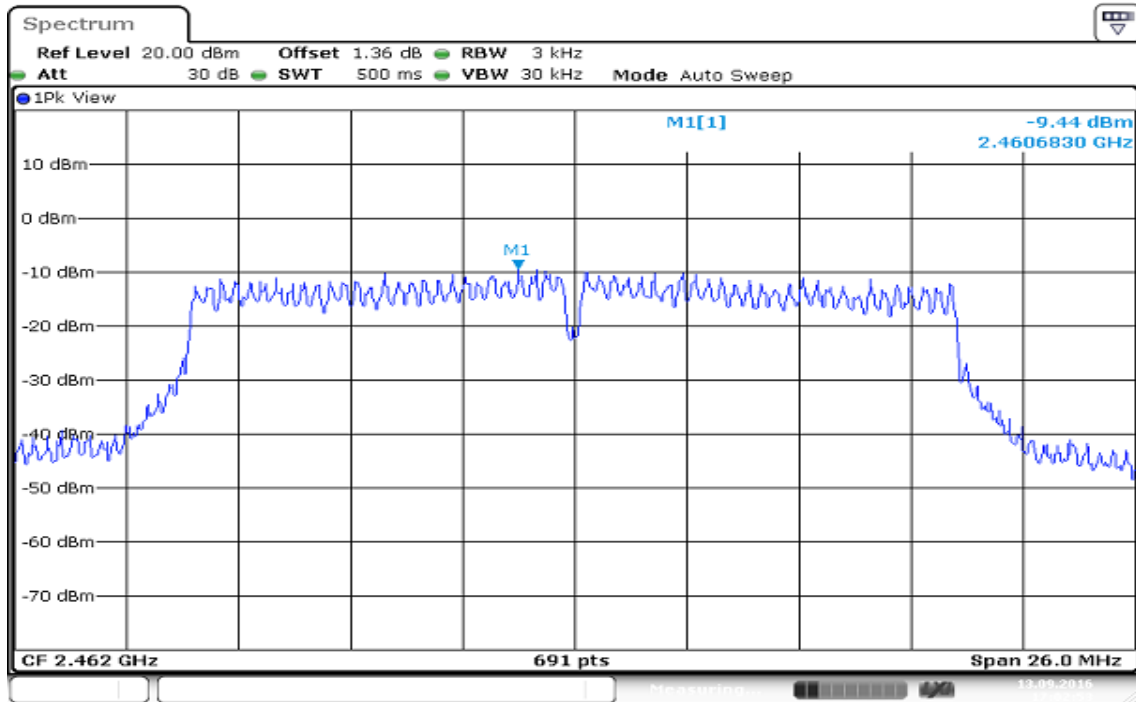
Date: 13 SEP 2016 16:53:50

PPSD (CH Mid)



Date: 13 SEP 2016 16:56:35

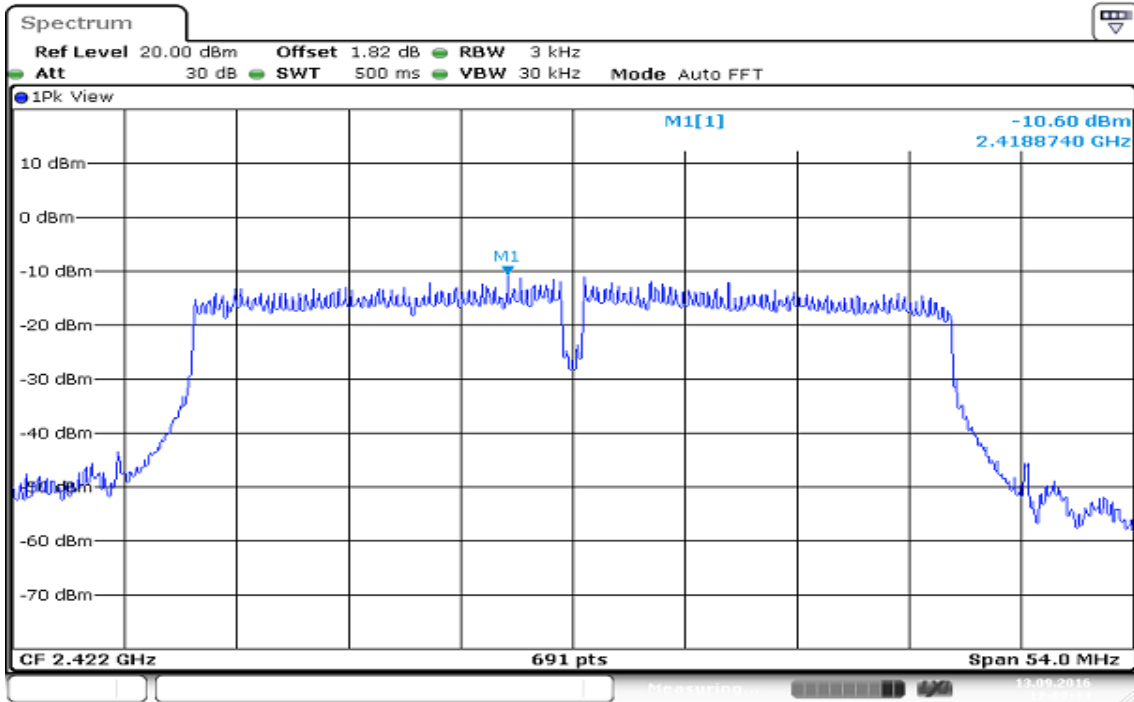
PPSD (CH High)



Date: 13 SEP 2016 17:02:53

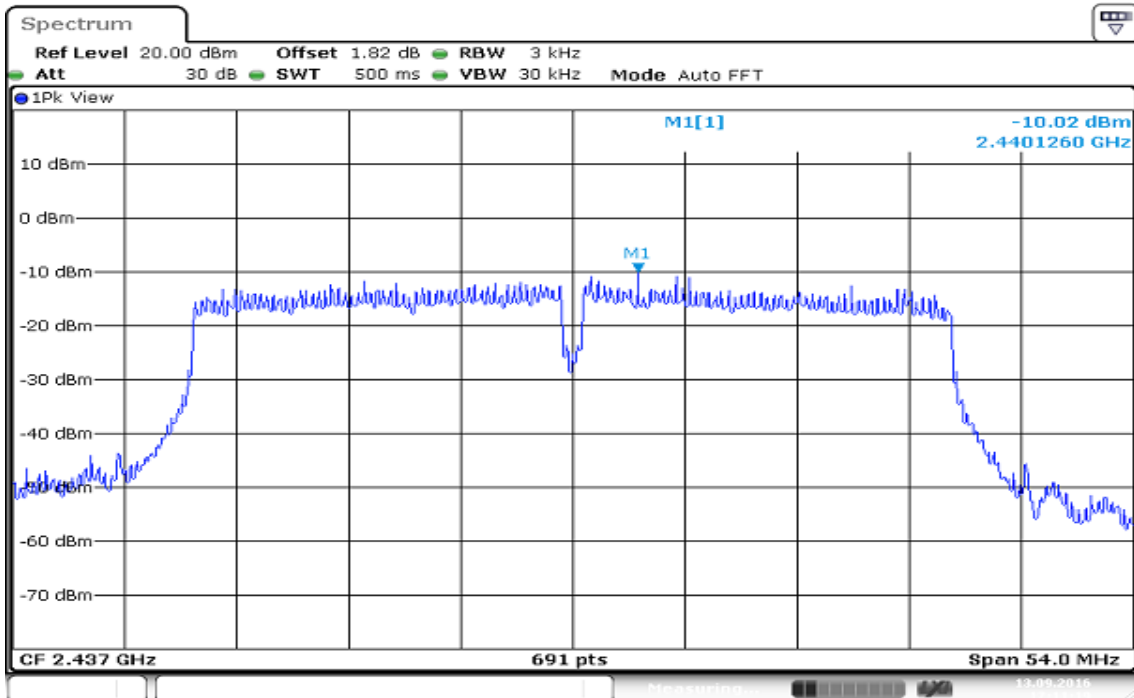
IEEE 802.11n HT 40 MHz mode / Chain 0

PPSD (CH Low)



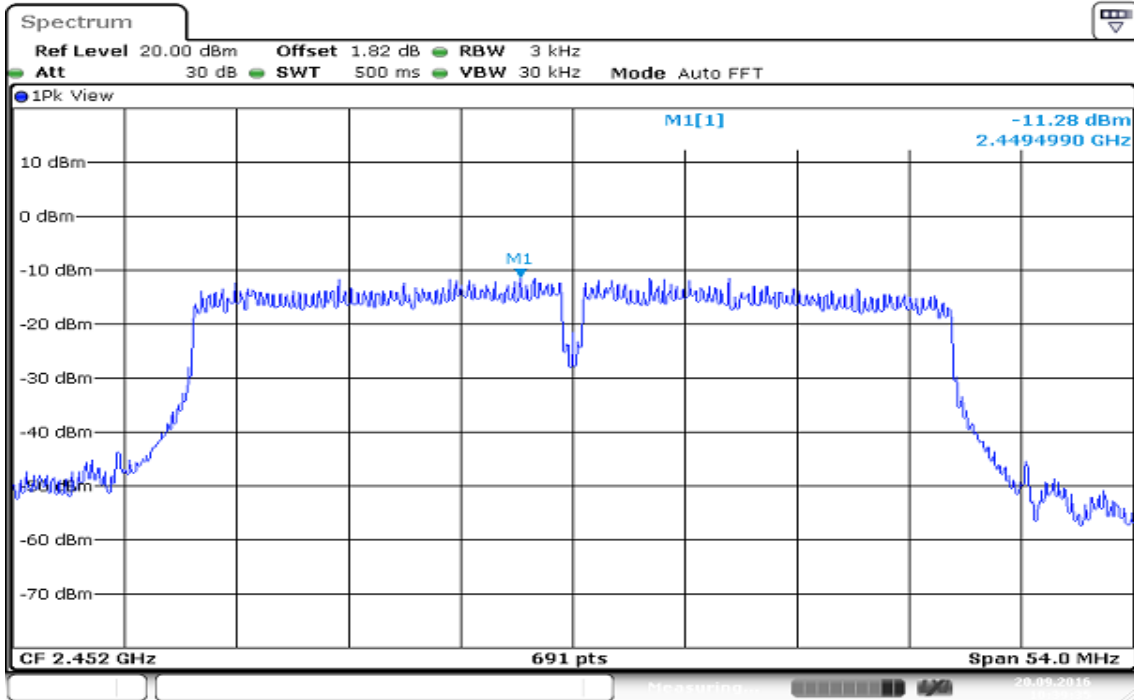
Date: 13 SEP 2016 17:08:34

PPSD (CH Mid)



Date: 13 SEP 2016 17:11:19

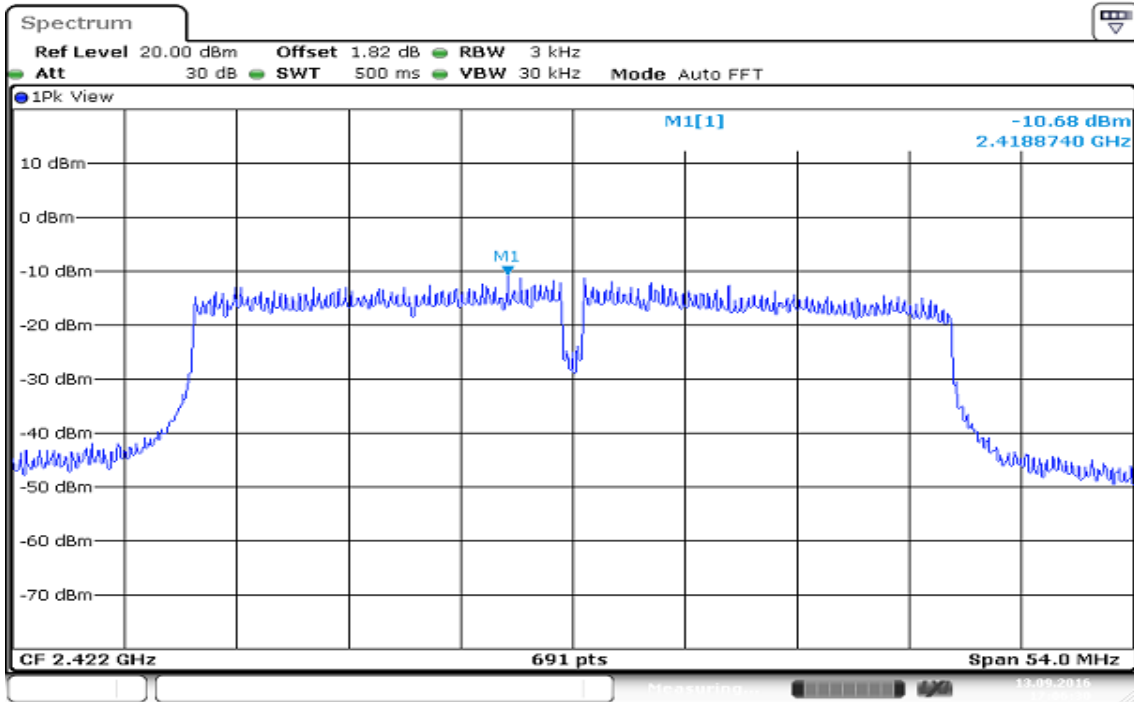
PPSD (CH High)



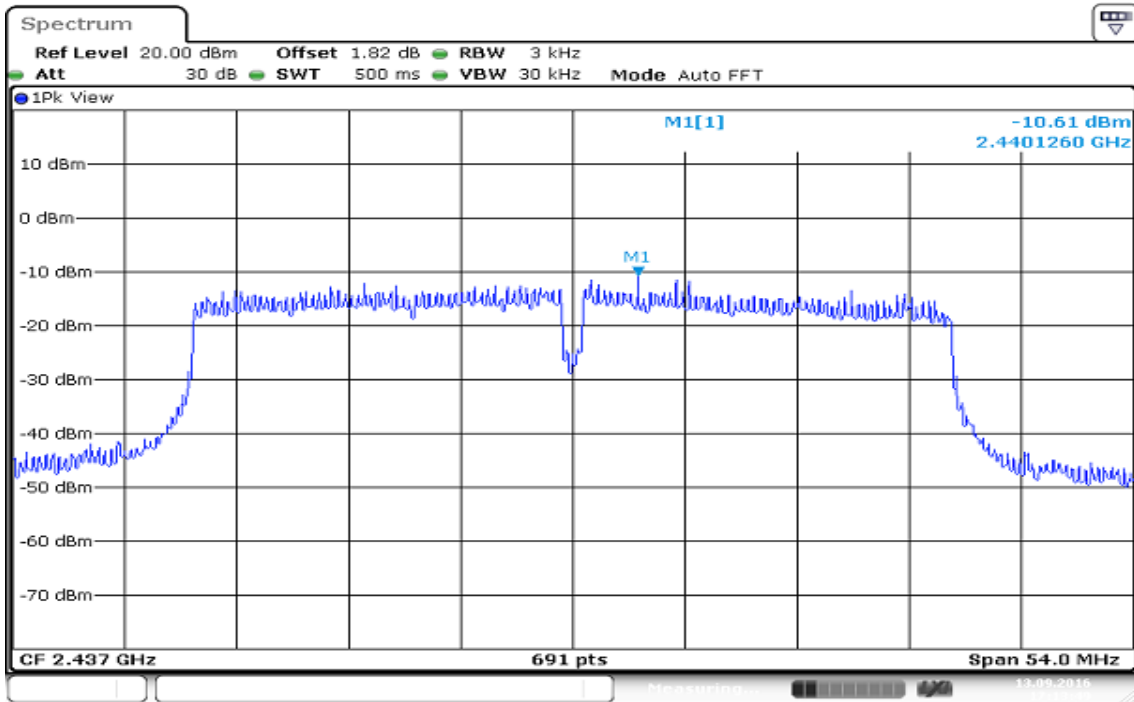
Date: 20 SEP 2016 10:39:35

IEEE 802.11n HT 40 MHz mode / Chain 1

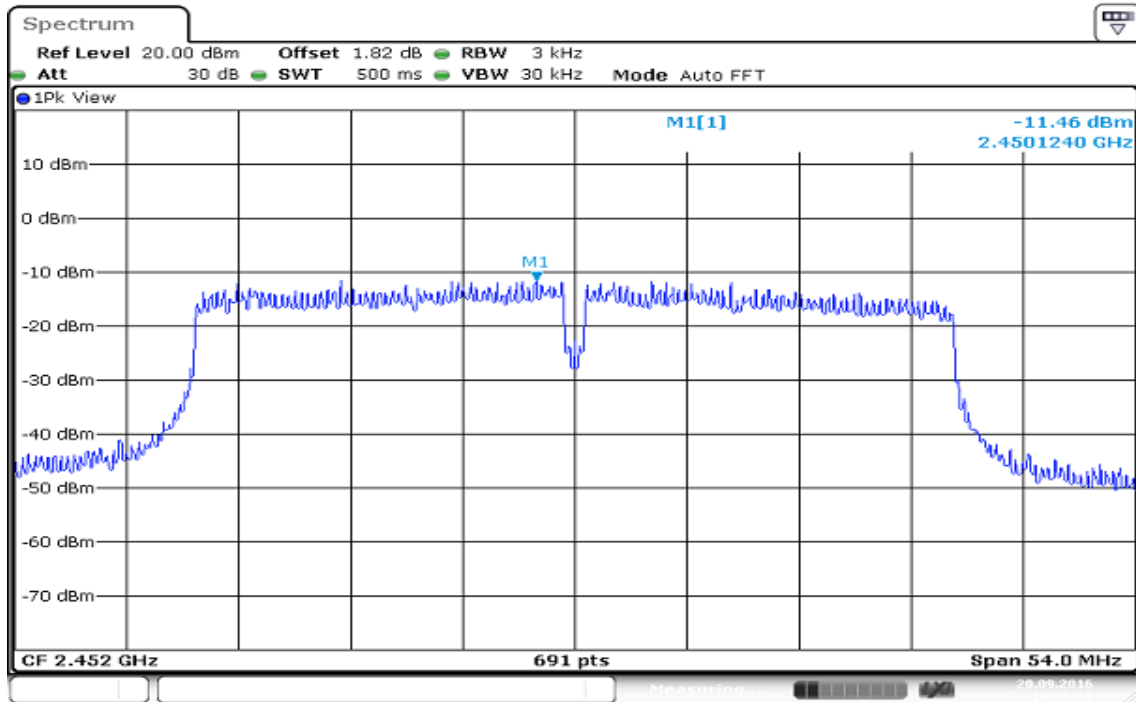
PPSD (CH Low)



PPSD (CH Mid)



PPSD (CH High)



Date: 20 SEP 2016 10:36:20

7.7 RADIATED EMISSIONS

LIMIT

All spurious emissions shall comply with the limits of §15.209(a) and RSS-Gen Table 2 & Table 4.

RSS-Gen Table 2 & Table 4: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz ^(Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: *Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 6.5.

Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

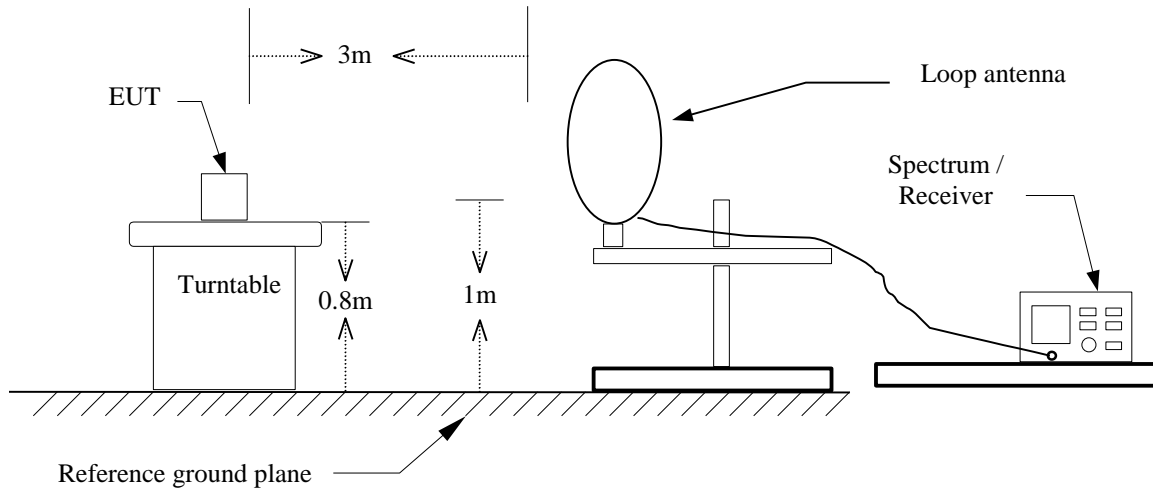
RSS-Gen Table 5: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	3000
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

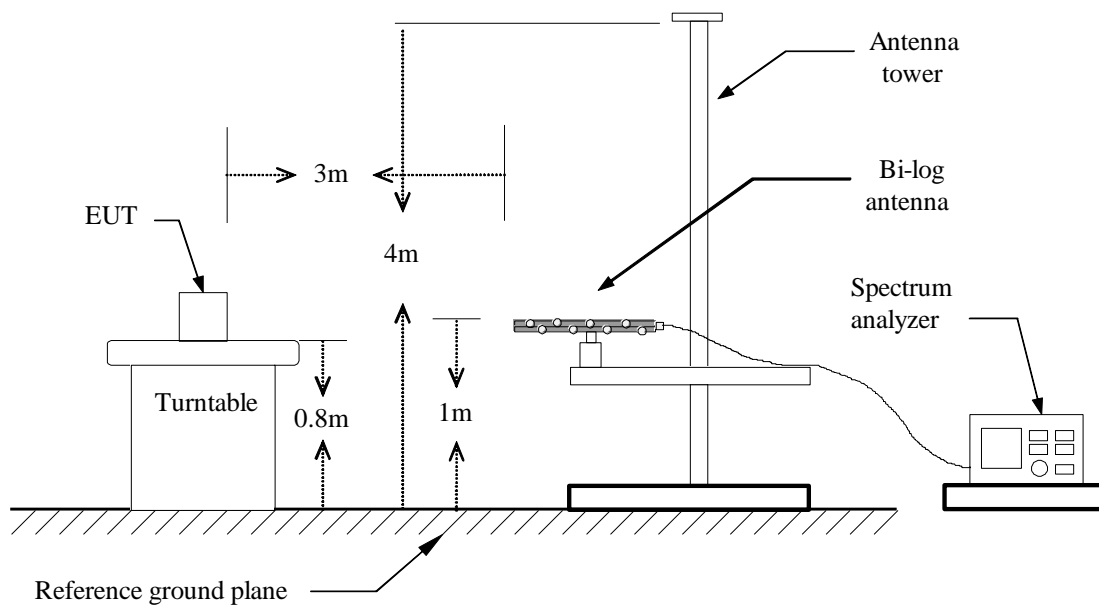
Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

Test Configuration

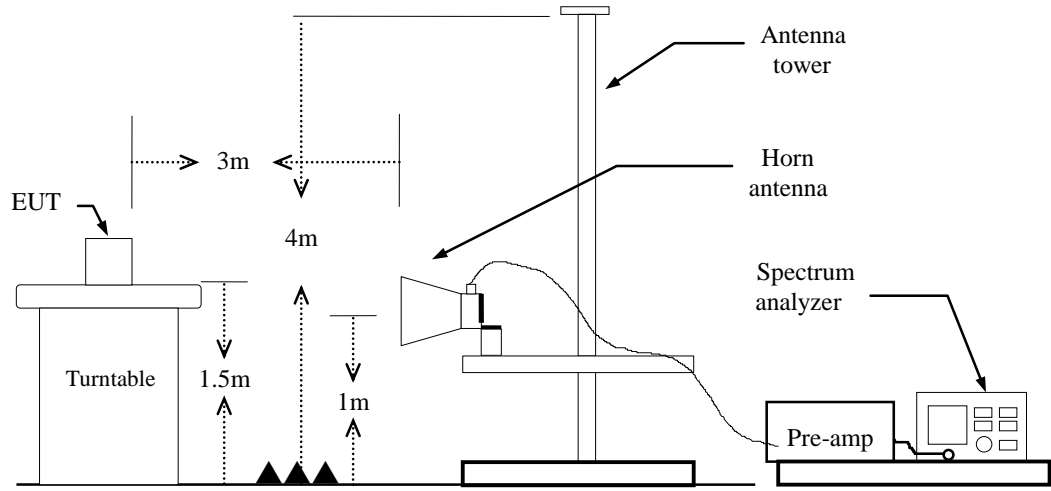
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m high and below 1 GHz is 0.8m high above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz,
if duty cycle \geq 98%, VBW=10Hz.
if duty cycle < 98% VBW=1/T.

IEEE 802.11b mode: =98%, VBW=120Hz

IEEE 802.11g mode: =92%, VBW=680Hz

IEEE 802.11n HT 20 MHz mode: =88%, VBW=750Hz

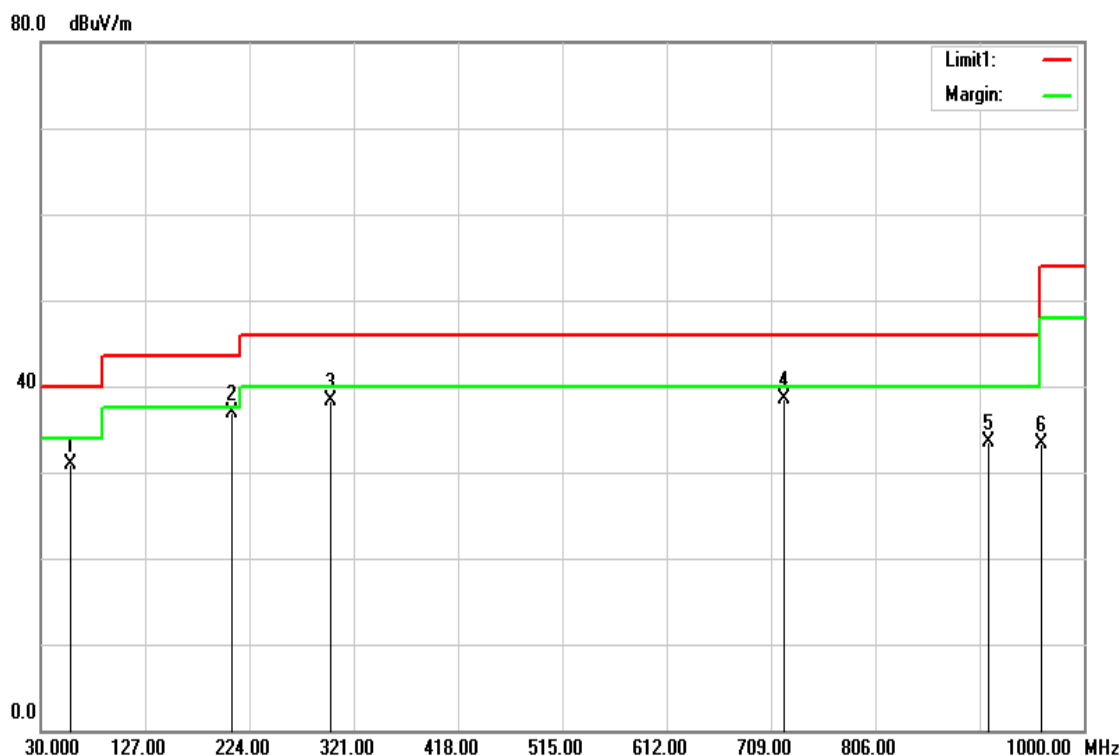
IEEE 802.11n HT 40 MHz mode: =81%, VBW=1.3kHz

7. Repeat above procedures until the measurements for all frequencies are complete.
8. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant

Note: We checked every harmonics frequencies from Fundamental frequencies with reduced VBW, and we mark a point to prove pass or not if we find any emission. For this case, there are no emissions hidden in the noise floor.

Below 1GHz

Operation Mode: Normal Link **Test Date:** September 7, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver.

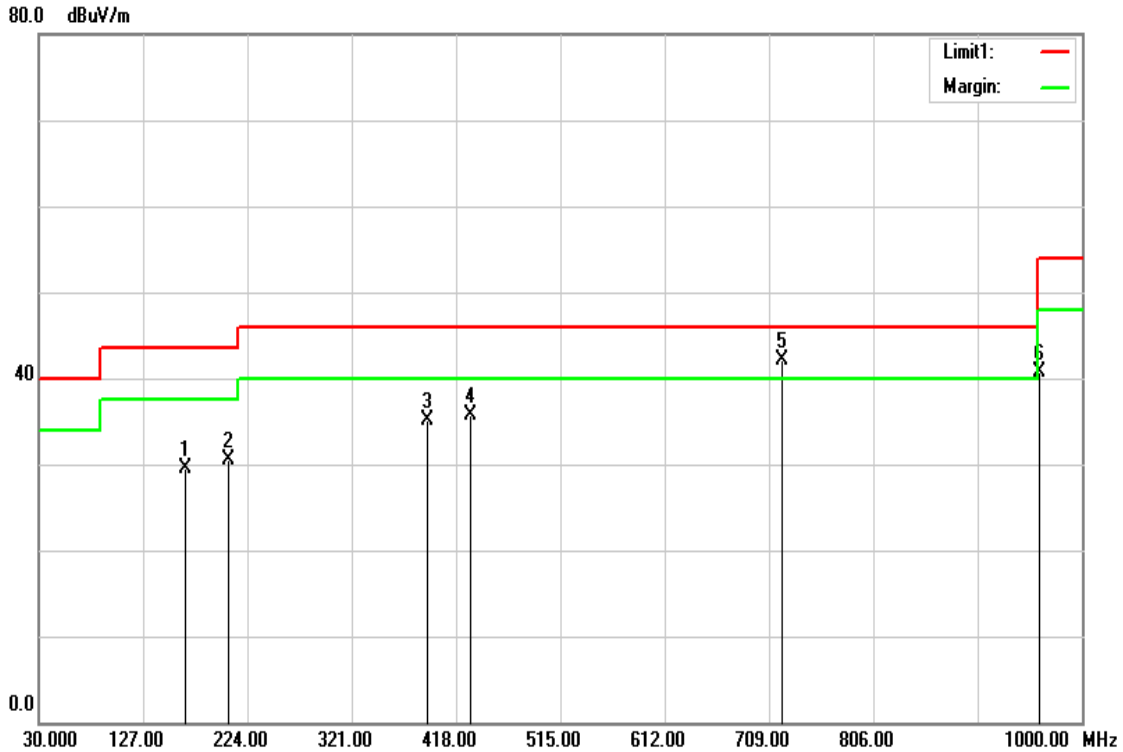


Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
57.1600	52.63	-21.81	30.82	40.00	-9.18	QP	V
207.5100	52.99	-16.08	36.91	43.50	-6.59	QP	V
299.6600	52.56	-14.25	38.31	46.00	-7.69	peak	V
720.6400	44.08	-5.60	38.48	46.00	-7.52	peak	V
911.7300	36.48	-3.00	33.48	46.00	-12.52	peak	V
960.2300	35.51	-2.23	33.28	54.00	-20.72	peak	V

Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).

Operation Mode: Normal Link **Test Date:** September 7, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
165.8000	46.18	-16.64	29.54	43.50	-13.96	QP	H
206.5400	46.44	-16.01	30.43	43.50	-13.07	QP	H
390.8400	47.08	-11.92	35.16	46.00	-10.84	peak	H
431.5800	46.46	-10.75	35.71	46.00	-10.29	peak	H
720.6400	47.75	-5.60	42.15	46.00	-3.85	peak	H
960.2300	42.87	-2.23	40.64	54.00	-13.36	peak	H

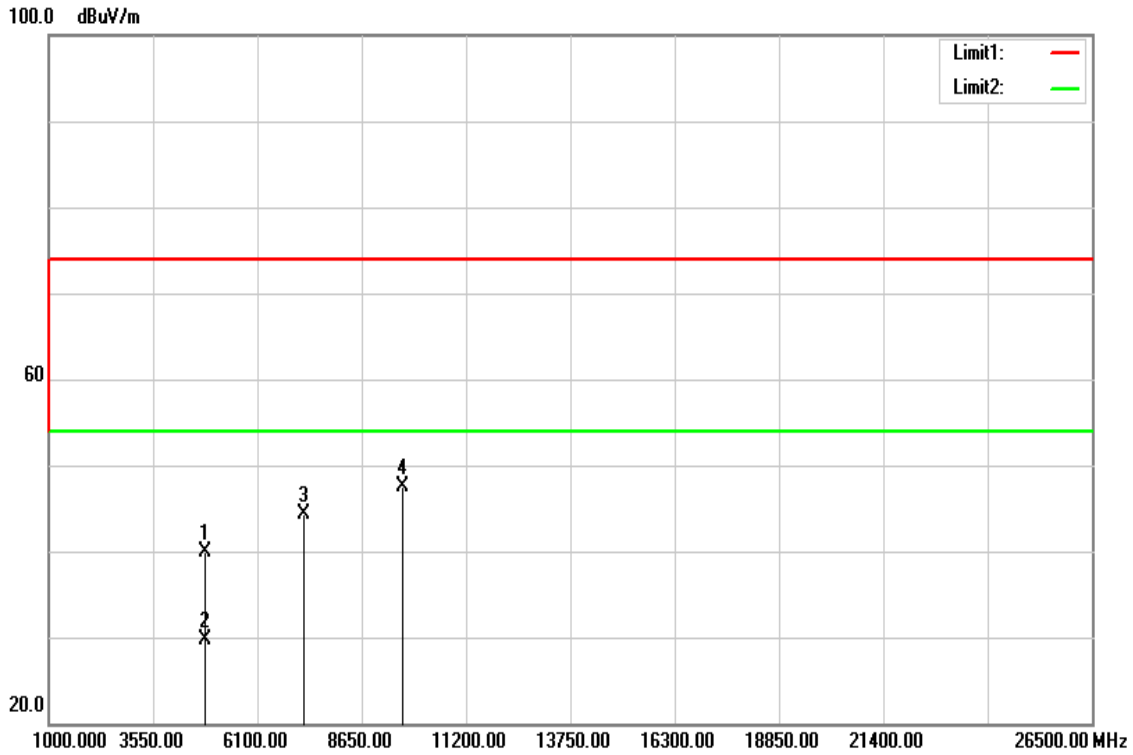
Remark:

1. Measuring frequencies from 30 MHz to the 1GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Result (dBuV/m) – Limit (dBuV/m).

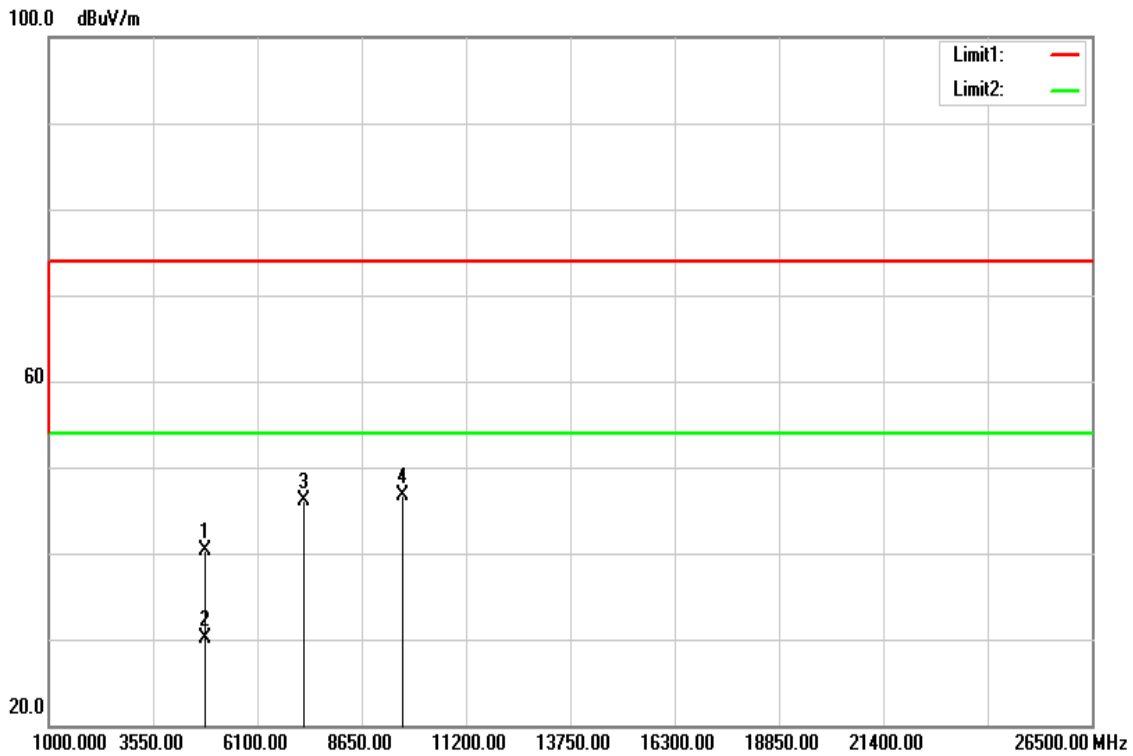
Above 1 GHz

TX / IEEE 802.11b / CH Low

Polarity: Vertical



Polarity: Horizontal



Above 1 GHz

Operation Mode: TX / IEEE 802.11b / CH Low **Test Date:** September 8, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

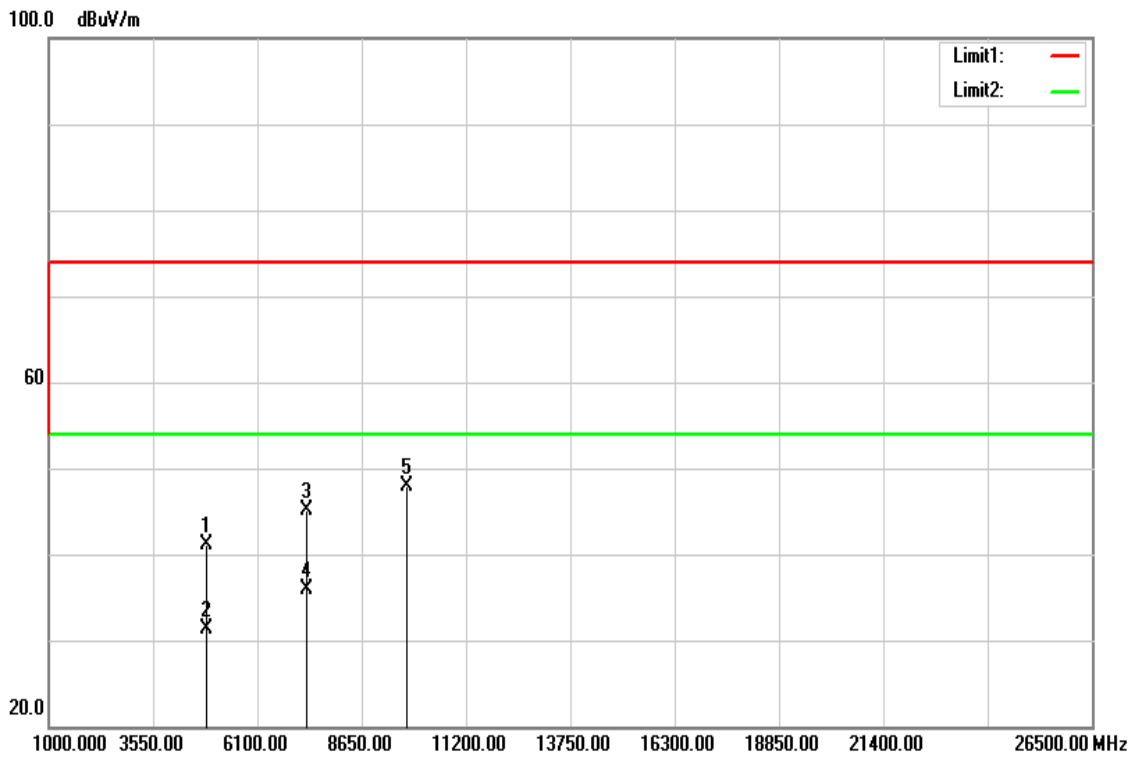
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4824.000	35.67	4.19	39.86	74.00	-34.14	peak	V
4824.000	25.44	4.19	29.63	54.00	-24.37	AVG	V
7236.000	32.80	11.40	44.20	74.00	-29.80	peak	V
9648.000	32.10	15.35	47.45	74.00	-26.55	peak	V
N/A							
4824.000	36.12	4.19	40.31	74.00	-33.69	peak	H
4824.000	25.94	4.19	30.13	54.00	-23.87	AVG	H
7236.000	34.62	11.40	46.02	74.00	-27.98	peak	H
9648.000	31.28	15.35	46.63	74.00	-27.37	peak	H
N/A							

Remark:

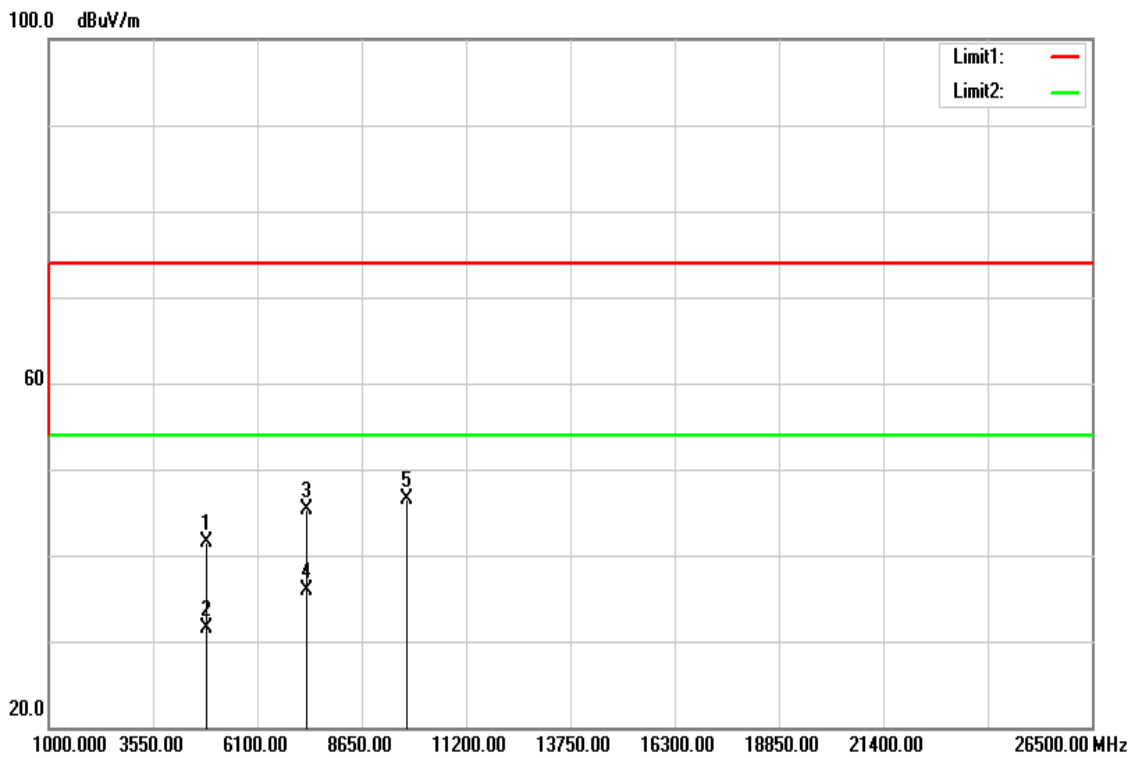
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11b / CH Mid

Polarity: Vertical



Polarity: Horizontal



Operation Mode: TX / IEEE 802.11b / CH Mid **Test Date:** September 8, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4874.000	36.75	4.31	41.06	74.00	-32.94	peak	V
4874.000	26.94	4.31	31.25	54.00	-22.75	AVG	V
7311.000	33.52	11.55	45.07	74.00	-28.93	peak	V
7311.000	24.32	11.55	35.87	54.00	-18.13	AVG	V
9748.000	32.34	15.49	47.83	74.00	-26.17	peak	V
N/A							
4874.000	37.23	4.31	41.54	74.00	-32.46	peak	H
4874.000	27.21	4.31	31.52	54.00	-22.48	AVG	H
7311.000	33.71	11.55	45.26	74.00	-28.74	peak	H
7311.000	24.31	11.55	35.86	54.00	-18.14	AVG	H
9748.000	31.07	15.49	46.56	74.00	-27.44	peak	H
N/A							

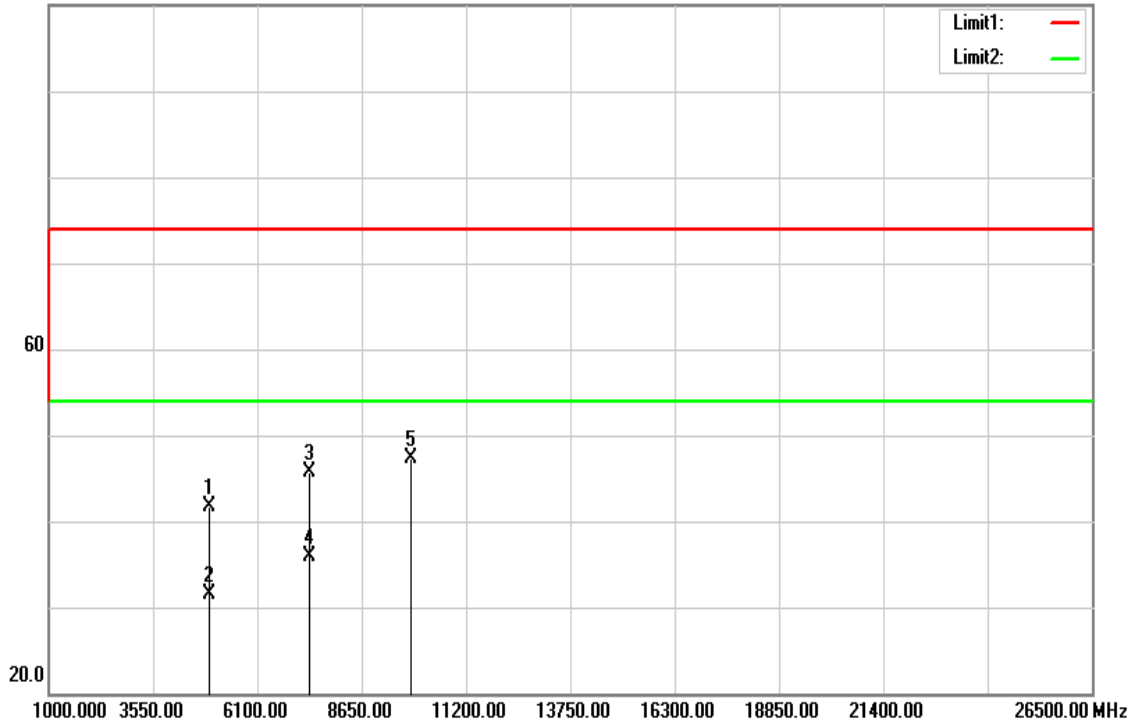
Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11b / CH High

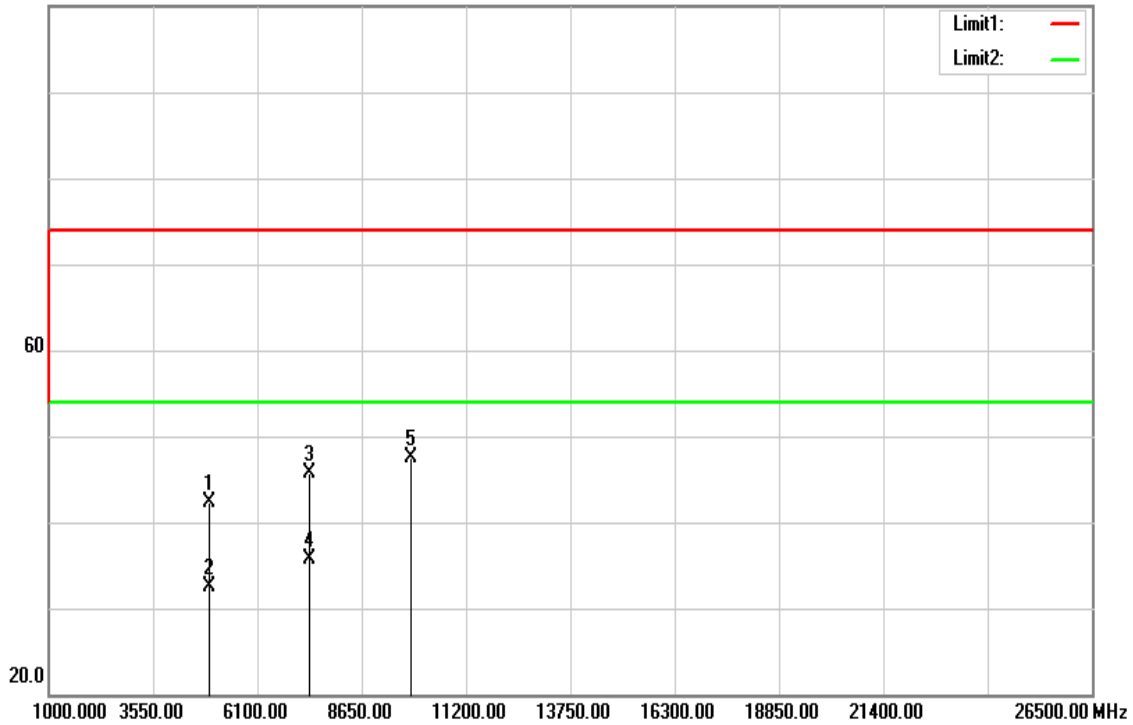
Polarity: Vertical

100.0 dBuV/m



Polarity: Horizontal

100.0 dBuV/m



Operation Mode: TX / IEEE 802.11b / CH High **Test Date:** September 8, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4924.000	37.34	4.45	41.79	74.00	-32.21	peak	V
4924.000	27.00	4.45	31.45	54.00	-22.55	AVG	V
7386.000	34.01	11.70	45.71	74.00	-28.29	peak	V
7386.000	24.17	11.70	35.87	54.00	-18.13	AVG	V
9848.000	31.75	15.63	47.38	74.00	-26.62	peak	V
N/A							
4924.000	37.92	4.45	42.37	74.00	-31.63	peak	H
4924.000	28.11	4.45	32.56	54.00	-21.44	AVG	H
7386.000	34.06	11.70	45.76	74.00	-28.24	peak	H
7386.000	24.04	11.70	35.74	54.00	-18.26	AVG	H
9848.000	31.78	15.63	47.41	74.00	-26.59	peak	H
N/A							

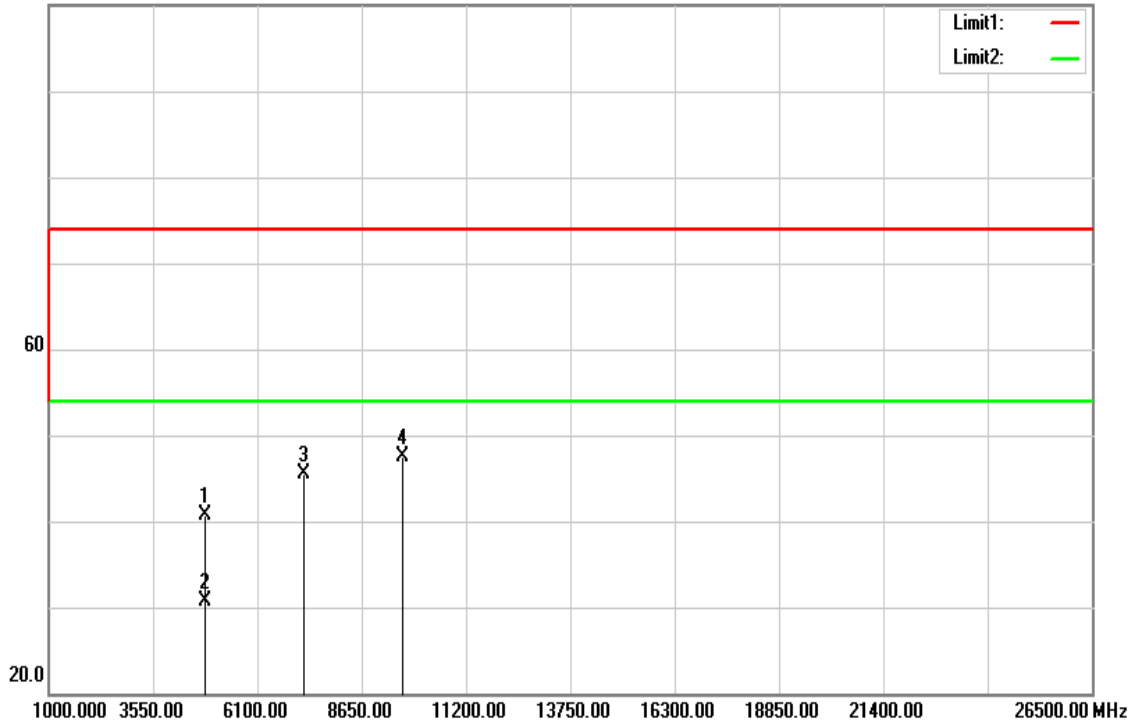
Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11g / CH Low

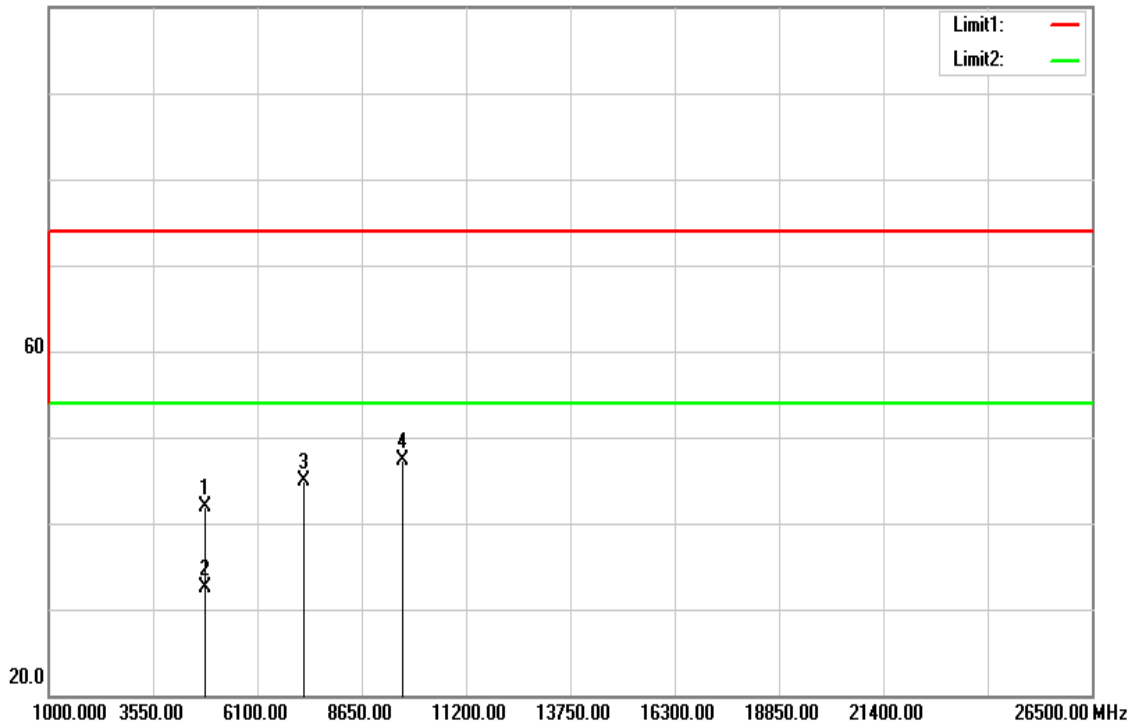
Polarity: Vertical

100.0 dBuV/m



Polarity: Horizontal

100.0 dBuV/m



Operation Mode: TX / IEEE 802.11g / CH Low **Test Date:** September 8, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

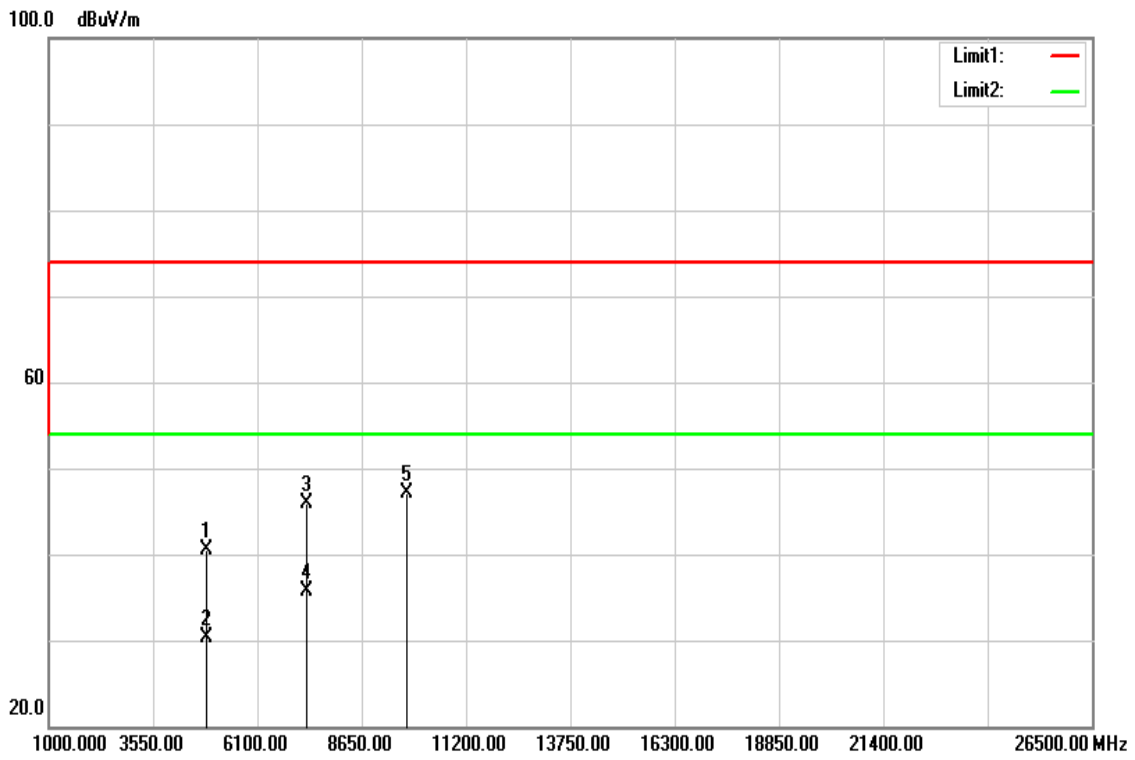
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4824.000	36.54	4.19	40.73	74.00	-33.27	peak	V
4824.000	26.46	4.19	30.65	54.00	-23.35	AVG	V
7236.000	34.08	11.40	45.48	74.00	-28.52	peak	V
9648.000	32.08	15.35	47.43	74.00	-26.57	peak	V
N/A							
4824.000	37.81	4.19	42.00	74.00	-32.00	peak	H
4824.000	28.31	4.19	32.50	54.00	-21.50	AVG	H
7236.000	33.55	11.40	44.95	74.00	-29.05	peak	H
9648.000	32.02	15.35	47.37	74.00	-26.63	peak	H
N/A							

Remark:

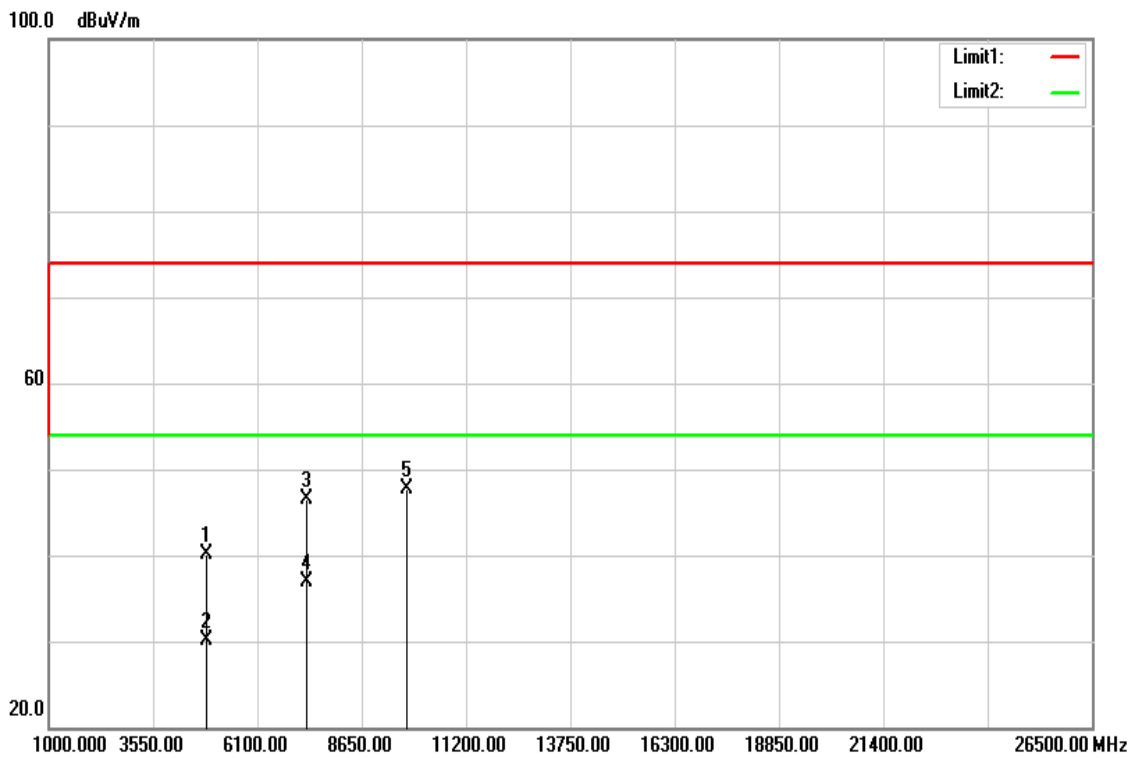
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11g / CH Mid

Polarity: Vertical



Polarity: Horizontal



Operation Mode: TX / IEEE 802.11g / CH Mid **Test Date:** September 8, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4874.000	36.28	4.31	40.59	74.00	-33.41	peak	V
4874.000	25.94	4.31	30.25	54.00	-23.75	AVG	V
7311.000	34.26	11.55	45.81	74.00	-28.19	peak	V
7311.000	24.13	11.55	35.68	54.00	-18.32	AVG	V
9748.000	31.62	15.49	47.11	74.00	-26.89	peak	V
N/A							
4874.000	35.85	4.31	40.16	74.00	-33.84	peak	H
4874.000	25.85	4.31	30.16	54.00	-23.84	AVG	H
7311.000	35.02	11.55	46.57	74.00	-27.43	peak	H
7311.000	25.29	11.55	36.84	54.00	-17.16	AVG	H
9748.000	32.30	15.49	47.79	74.00	-26.21	peak	H
N/A							

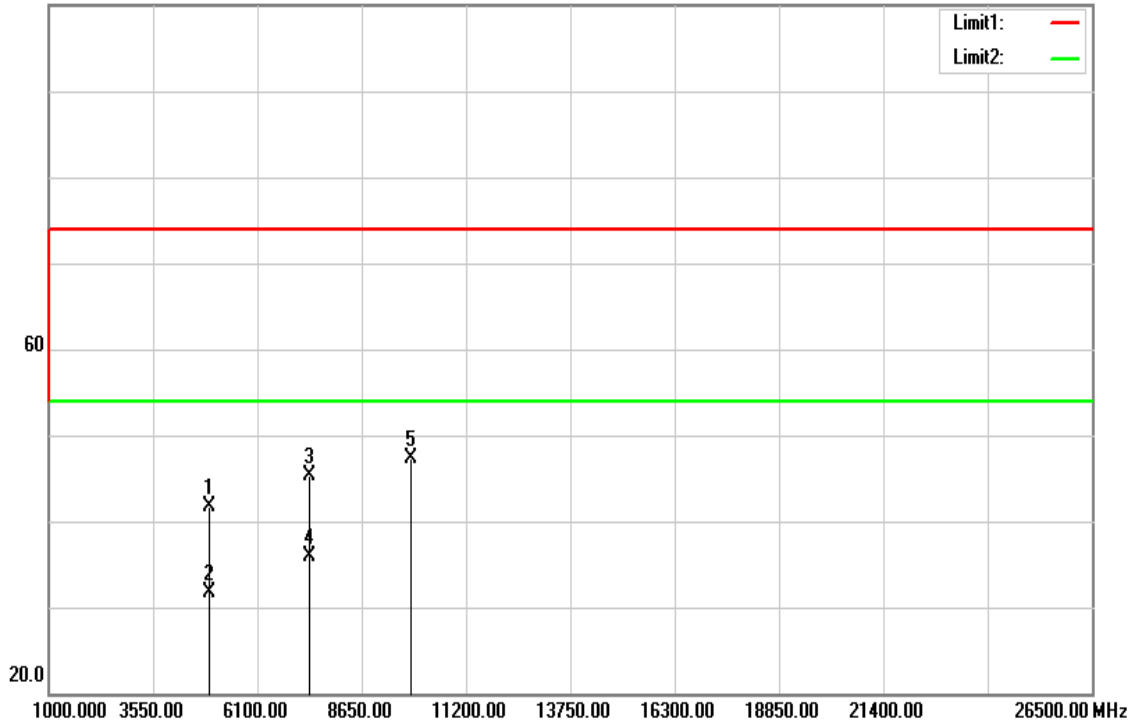
Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11g / CH High

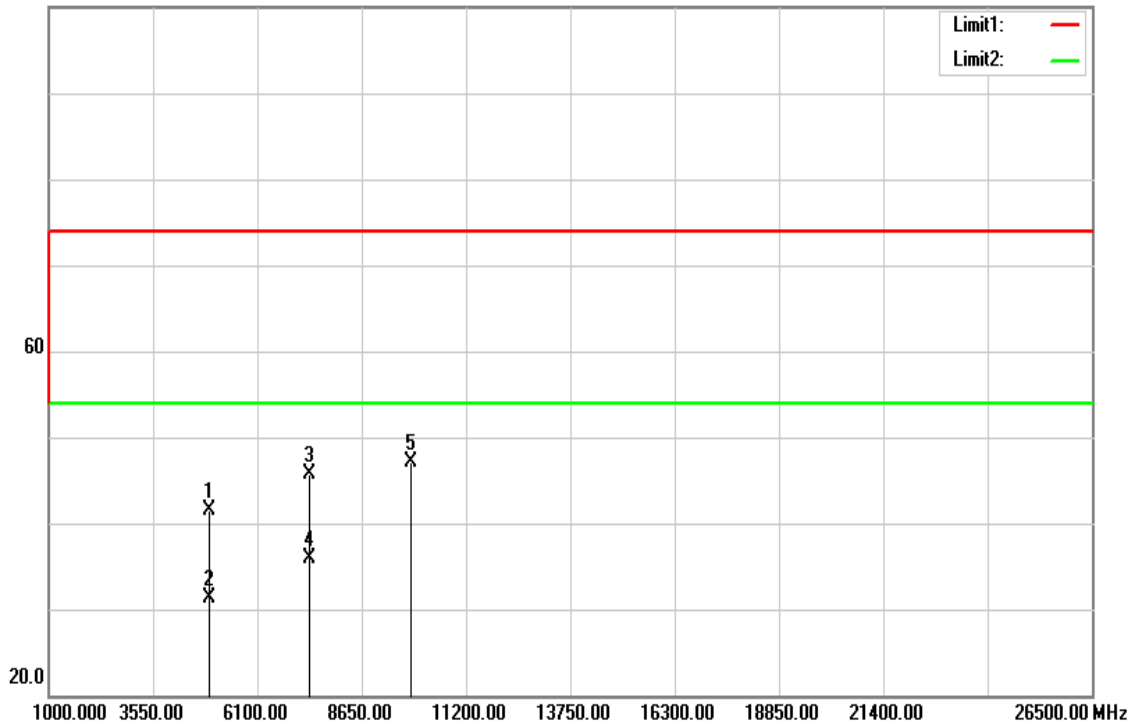
Polarity: Vertical

100.0 dBuV/m



Polarity: Horizontal

100.0 dBuV/m



Operation Mode: TX / IEEE 802.11g / CH High **Test Date:** September 8, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

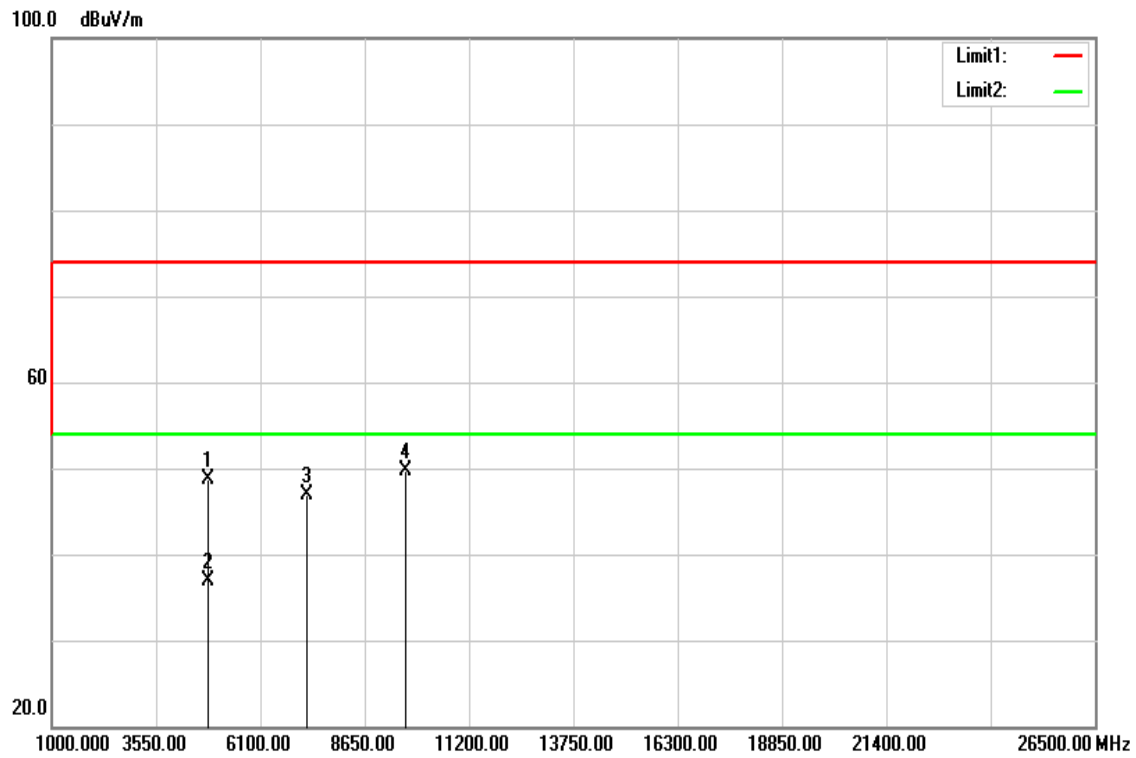
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4924.000	37.34	4.45	41.79	74.00	-32.21	peak	V
4924.000	27.20	4.45	31.65	54.00	-22.35	AVG	V
7386.000	33.56	11.70	45.26	74.00	-28.74	peak	V
7386.000	24.14	11.70	35.84	54.00	-18.16	AVG	V
9848.000	31.71	15.63	47.34	74.00	-26.66	peak	V
N/A							
4924.000	37.10	4.45	41.55	74.00	-32.45	peak	H
4924.000	26.80	4.45	31.25	54.00	-22.75	AVG	H
7386.000	34.00	11.70	45.70	74.00	-28.30	peak	H
7386.000	24.17	11.70	35.87	54.00	-18.13	AVG	H
9848.000	31.41	15.63	47.04	74.00	-26.96	peak	H
N/A							

Remark:

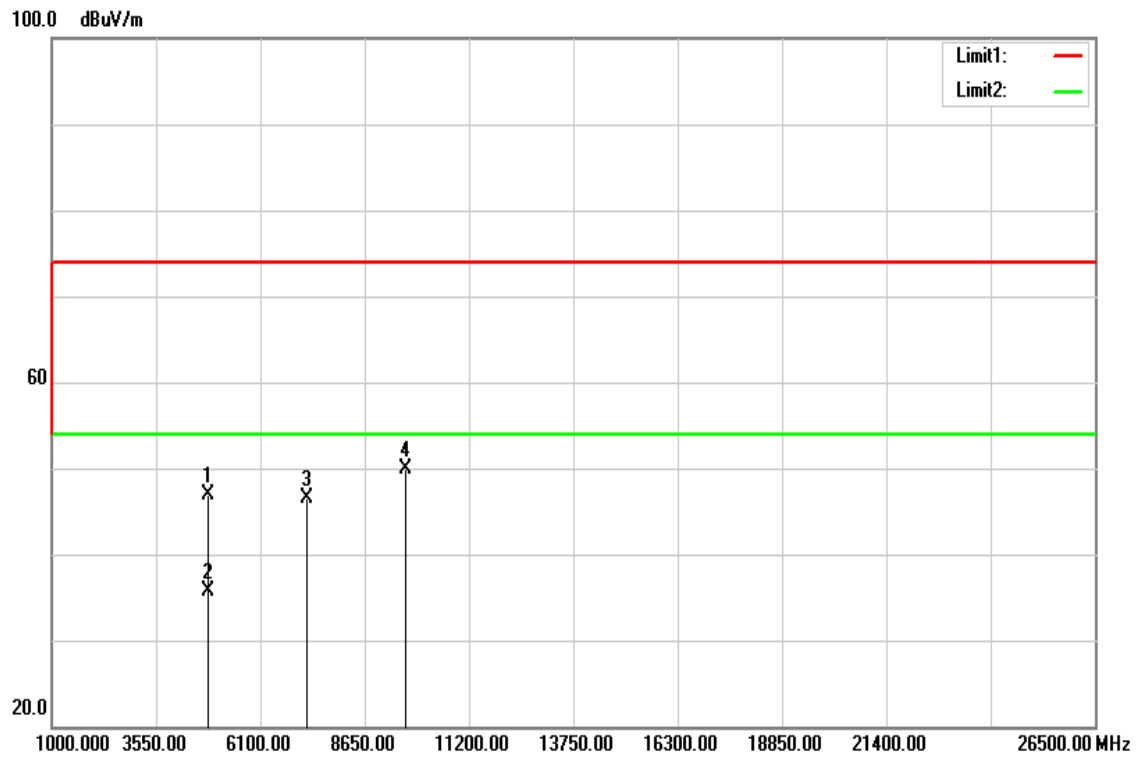
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11n HT 20 MHz mode / CH Low

Polarity: Vertical



Polarity: Horizontal



Operation Mode:TX / IEEE 802.11n HT 20 MHz mode / CH Low **Test Date:** September 15, 2016

Temperature: 27°C

Tested by:Dennis Li

Humidity: 53% RH

Polarity: Ver. / Hor.

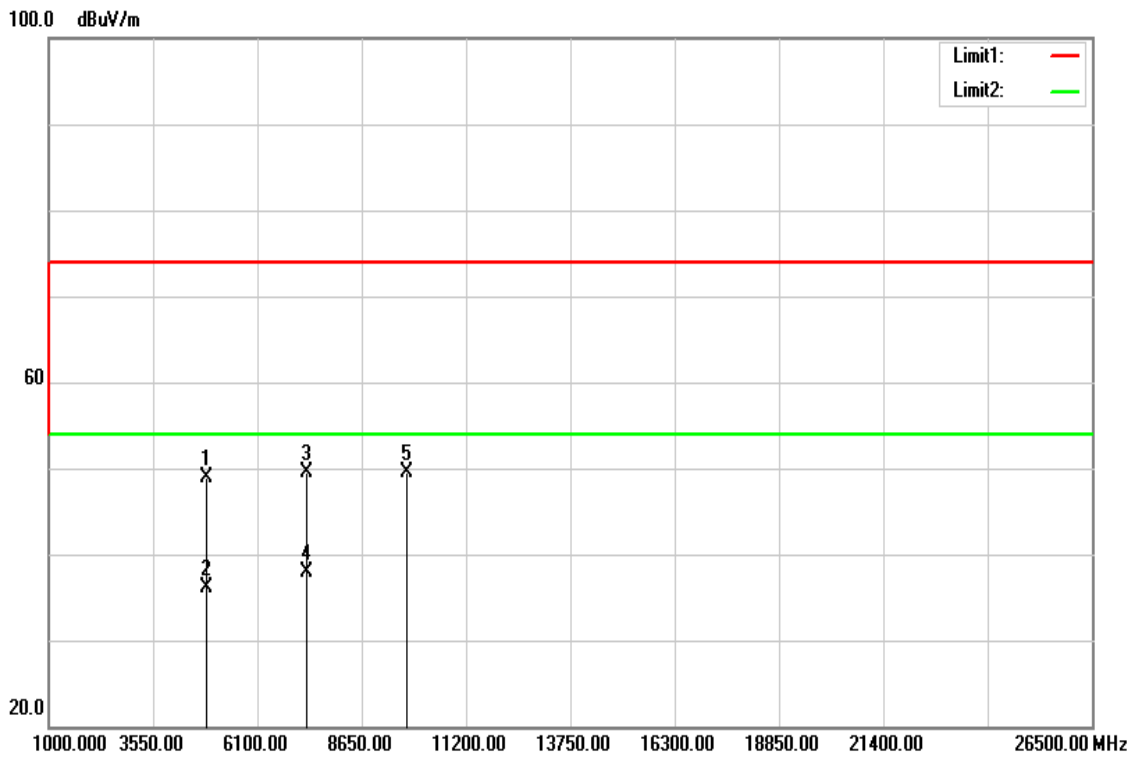
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4824.000	43.66	5.10	48.76	74.00	-25.24	peak	V
4824.000	31.79	5.10	36.89	54.00	-17.11	AVG	V
7236.000	34.24	12.71	46.95	74.00	-27.05	peak	V
9648.000	32.04	17.60	49.64	74.00	-24.36	peak	V
N/A							
4824.000	41.88	5.10	46.98	74.00	-27.02	peak	H
4824.000	30.64	5.10	35.74	54.00	-18.26	AVG	H
7236.000	33.87	12.71	46.58	74.00	-27.42	peak	H
9648.000	32.31	17.60	49.91	74.00	-24.09	peak	H
N/A							

Remark:

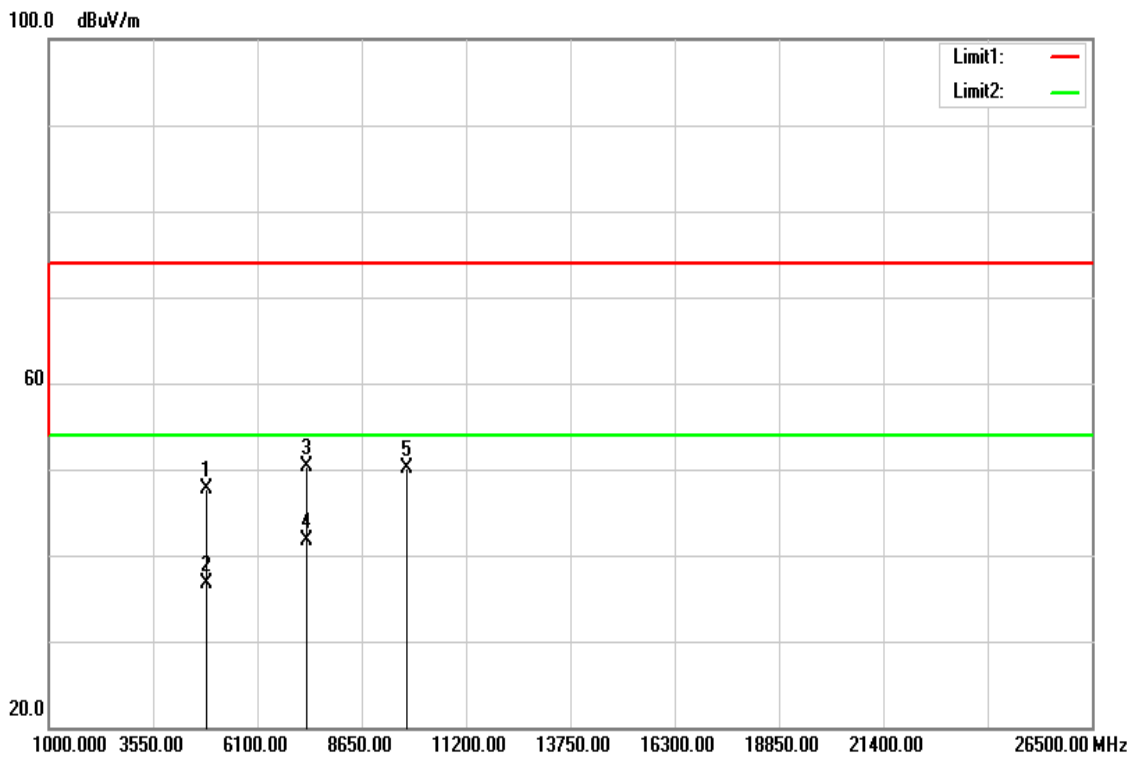
1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit or as required by the applicant.*
4. *Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*

TX / IEEE 802.11n HT 20 MHz mode / CH Mid

Polarity: Vertical



Polarity: Horizontal



Operation Mode:TX / IEEE 802.11n HT 20 MHz mode / CH Mid **Test Date:** September 15, 2016

Temperature: 27°C

Tested by:Dennis Li

Humidity: 53% RH

Polarity: Ver. / Hor.

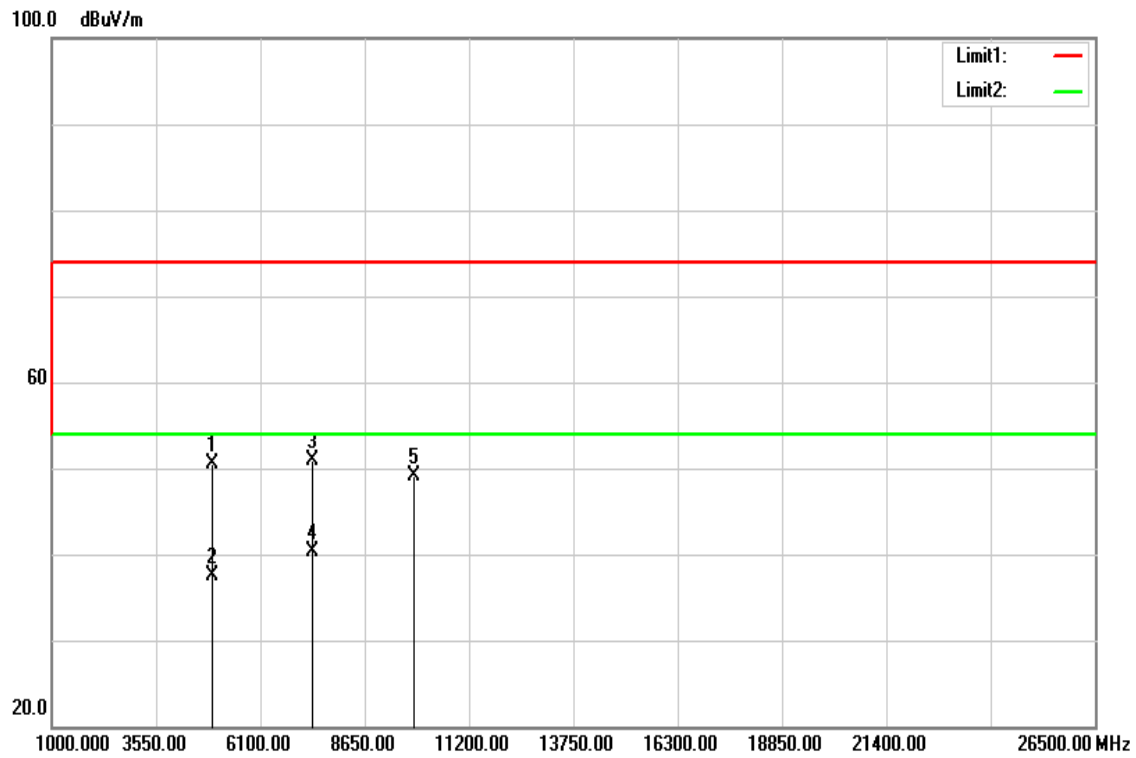
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4874.000	43.75	5.23	48.98	74.00	-25.02	peak	V
4874.000	30.95	5.23	36.18	54.00	-17.82	AVG	V
7311.000	36.53	12.94	49.47	74.00	-24.53	peak	V
7311.000	24.94	12.94	37.88	54.00	-16.12	AVG	V
9748.000	31.99	17.60	49.59	74.00	-24.41	peak	V
N/A							
4874.000	42.41	5.23	47.64	74.00	-26.36	peak	H
4874.000	31.54	5.23	36.77	54.00	-17.23	AVG	H
7311.000	37.29	12.94	50.23	74.00	-23.77	peak	H
7311.000	28.84	12.94	41.78	54.00	-12.22	AVG	H
9748.000	32.44	17.60	50.04	74.00	-23.96	peak	H
N/A							

Remark:

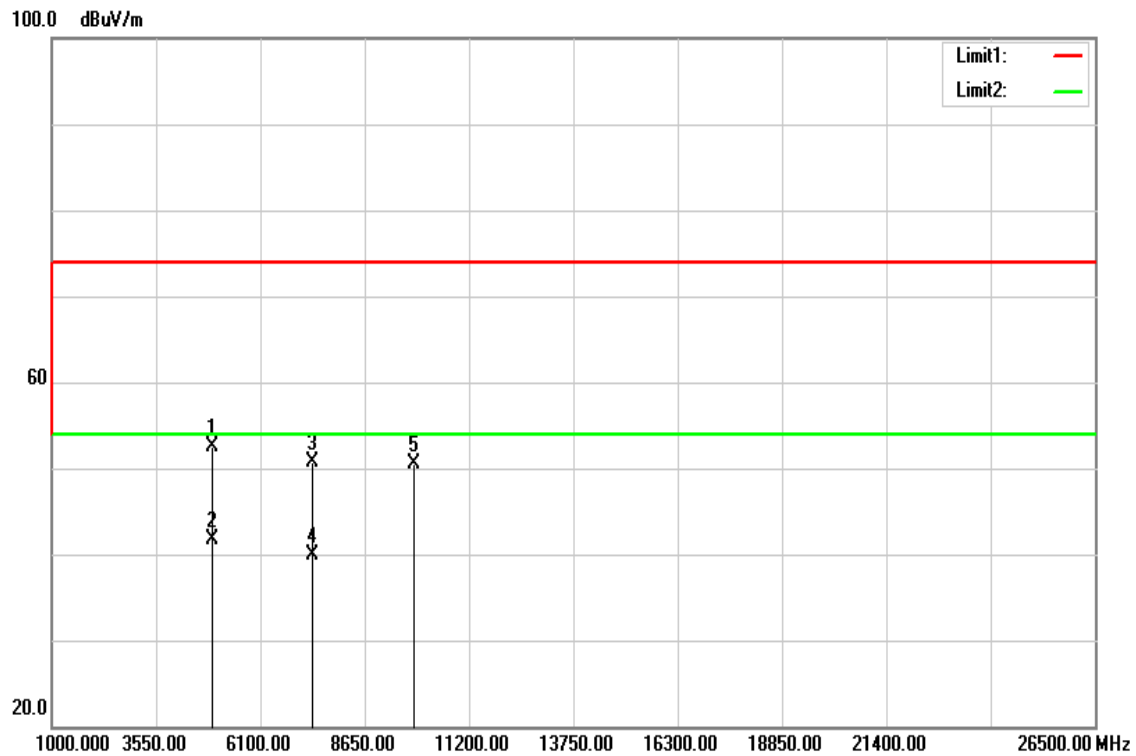
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11n HT 20 MHz mode / CH High

Polarity: Vertical



Polarity: Horizontal



Operation Mode: TX / IEEE 802.11n HT 20 MHz mode / CH High **Test Date:** September 15, 2016

Temperature: 27°C

Tested by: Dennis Li

Humidity: 53% RH

Polarity: Ver. / Hor.

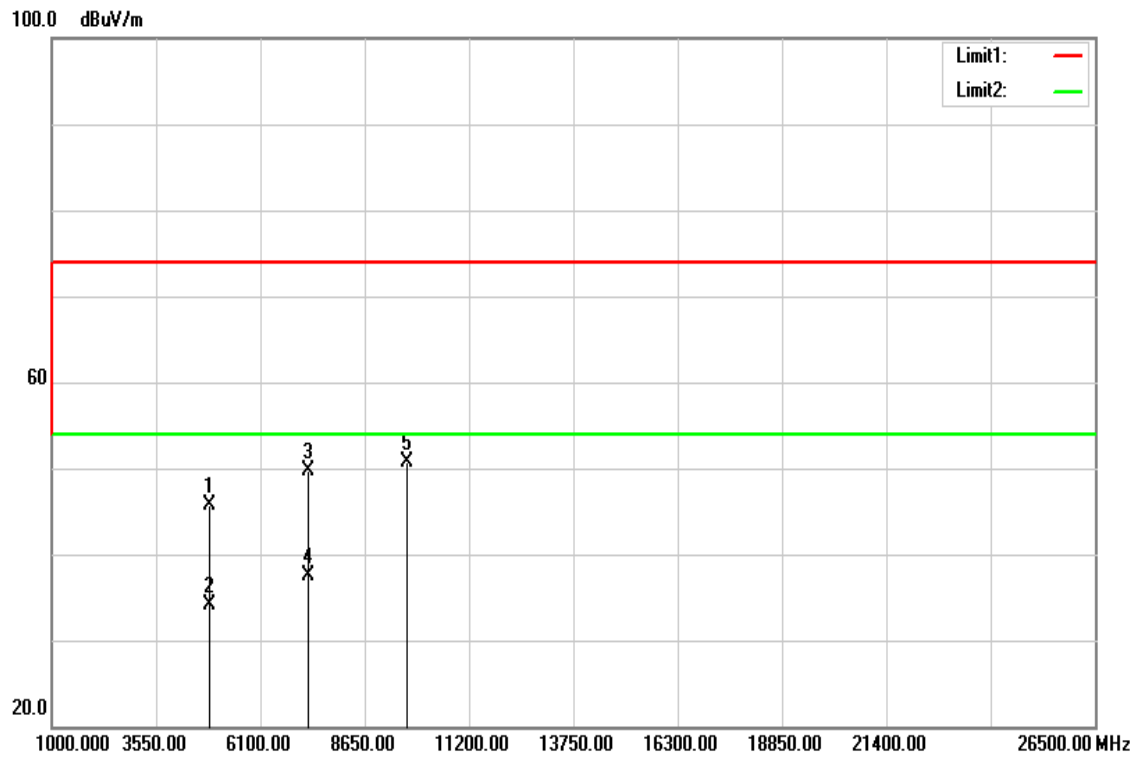
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4925.000	45.11	5.37	50.48	74.00	-23.52	peak	V
4925.000	32.14	5.37	37.51	54.00	-16.49	AVG	V
7386.000	37.65	13.17	50.82	74.00	-23.18	peak	V
7386.000	27.16	13.17	40.33	54.00	-13.67	AVG	V
9848.000	31.49	17.60	49.09	74.00	-24.91	peak	V
N/A							
4925.000	47.20	5.37	52.57	74.00	-21.43	peak	H
4925.000	36.40	5.37	41.77	54.00	-12.23	AVG	H
7386.000	37.55	13.17	50.72	74.00	-23.28	peak	H
7386.000	26.71	13.17	39.88	54.00	-14.12	AVG	H
9848.000	32.87	17.60	50.47	74.00	-23.53	peak	H
N/A							

Remark:

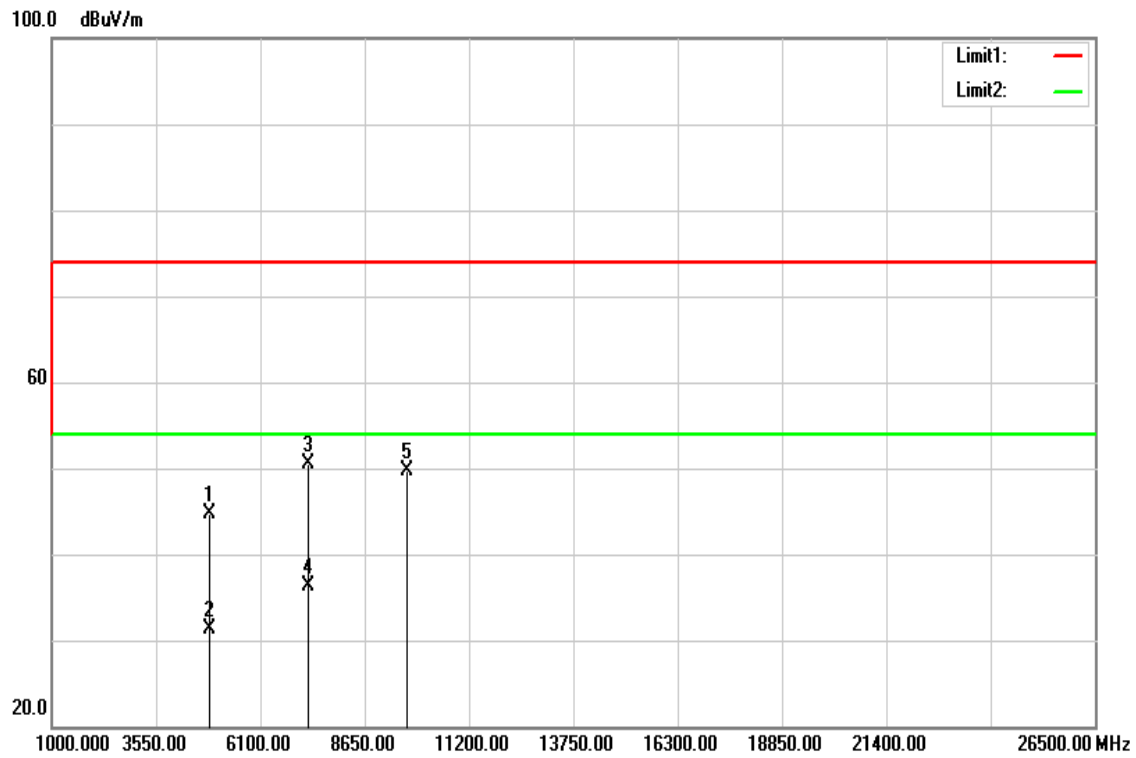
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11n HT 40 MHz mode / CH Low

Polarity: Vertical



Polarity: Horizontal



Operation Mode: TX / IEEE 802.11n HT 40 MHz mode / CH Low **Test Date:** September 15, 2016

Temperature: 27°C

Tested by: Dennis Li

Humidity: 53% RH

Polarity: Ver. / Hor.

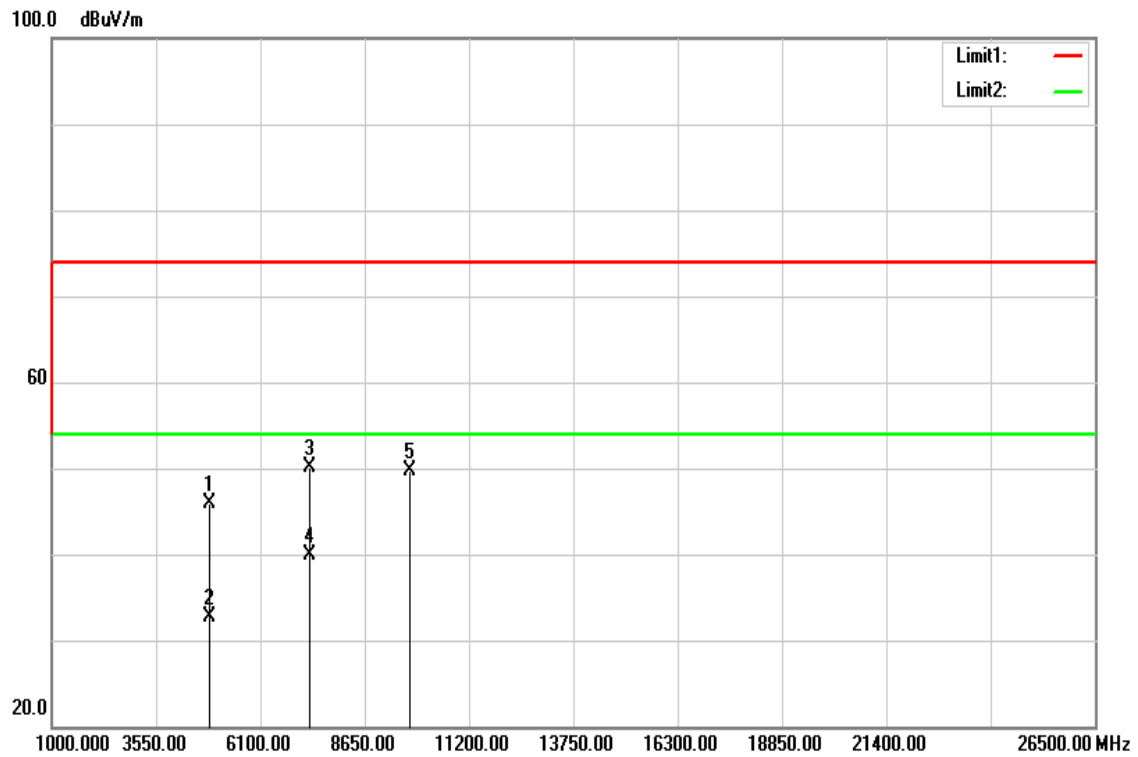
Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4844.000	40.49	5.15	45.64	74.00	-28.36	peak	V
4844.000	29.03	5.15	34.18	54.00	-19.82	AVG	V
7266.000	36.98	12.80	49.78	74.00	-24.22	peak	V
7266.000	24.64	12.80	37.44	54.00	-16.56	AVG	V
9688.000	33.02	17.60	50.62	74.00	-23.38	peak	V
N/A							
4844.000	39.62	5.15	44.77	74.00	-29.23	peak	H
4844.000	26.18	5.15	31.33	54.00	-22.67	AVG	H
7266.000	37.71	12.80	50.51	74.00	-23.49	peak	H
7266.000	23.41	12.80	36.21	54.00	-17.79	AVG	H
9688.000	32.20	17.60	49.80	74.00	-24.20	peak	H
N/A							

Remark:

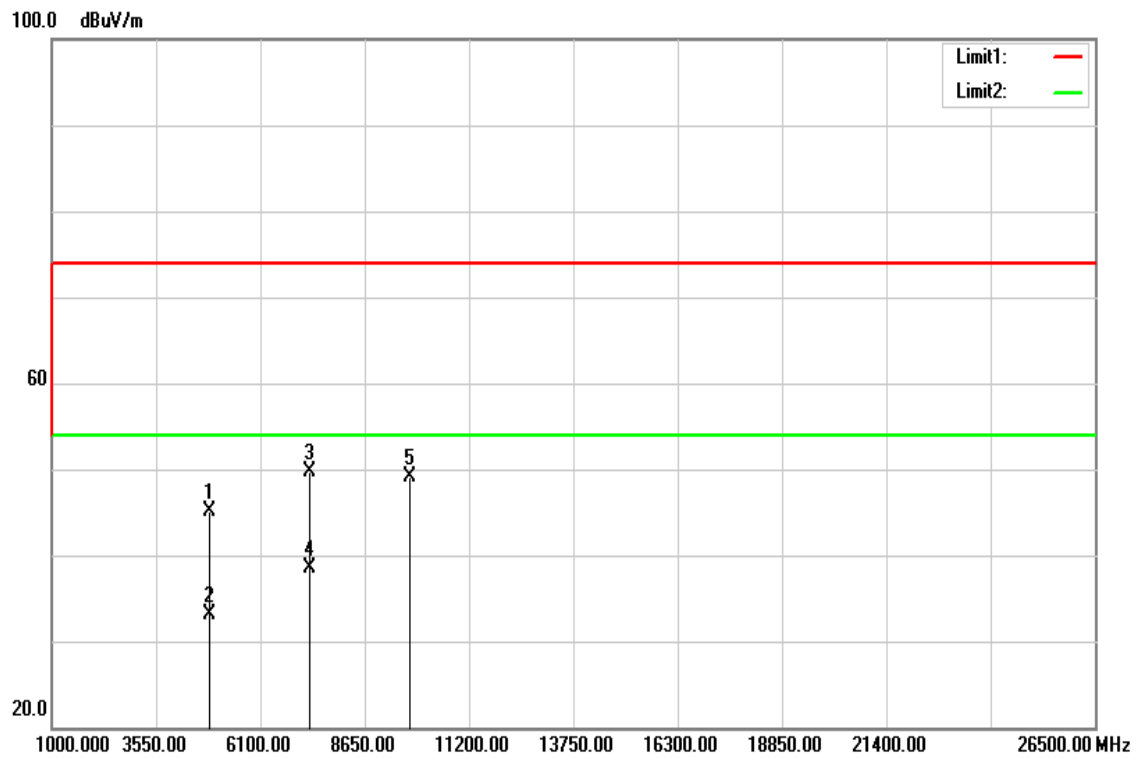
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11n HT 40 MHz mode / CH Mid

Polarity: Vertical



Polarity: Horizontal



Operation Mode: TX / IEEE 802.11n HT 40 MHz mode / CH Mid **Test Date:** September 15, 2016

Temperature: 27°C

Tested by: Dennis Li

Humidity: 53% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4874.000	40.76	5.23	45.99	74.00	-28.01	peak	V
4874.000	27.52	5.23	32.75	54.00	-21.25	AVG	V
7311.000	37.12	12.94	50.06	74.00	-23.94	peak	V
7311.000	26.93	12.94	39.87	54.00	-14.13	AVG	V
9748.000	32.06	17.60	49.66	74.00	-24.34	peak	V
N/A							
4874.000	39.87	5.23	45.10	74.00	-28.90	peak	H
4874.000	27.95	5.23	33.18	54.00	-20.82	AVG	H
7311.000	36.78	12.94	49.72	74.00	-24.28	peak	H
7311.000	25.63	12.94	38.57	54.00	-15.43	AVG	H
9748.000	31.58	17.60	49.18	74.00	-24.82	peak	H
N/A							

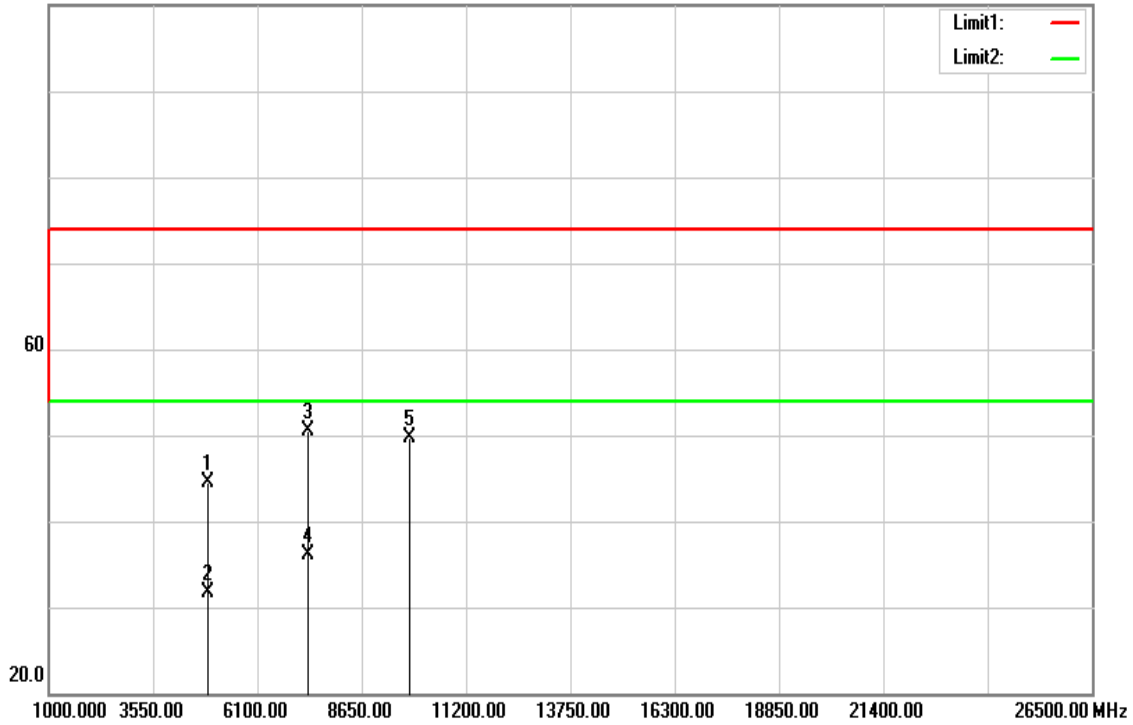
Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / IEEE 802.11n HT 40 MHz mode / CH High

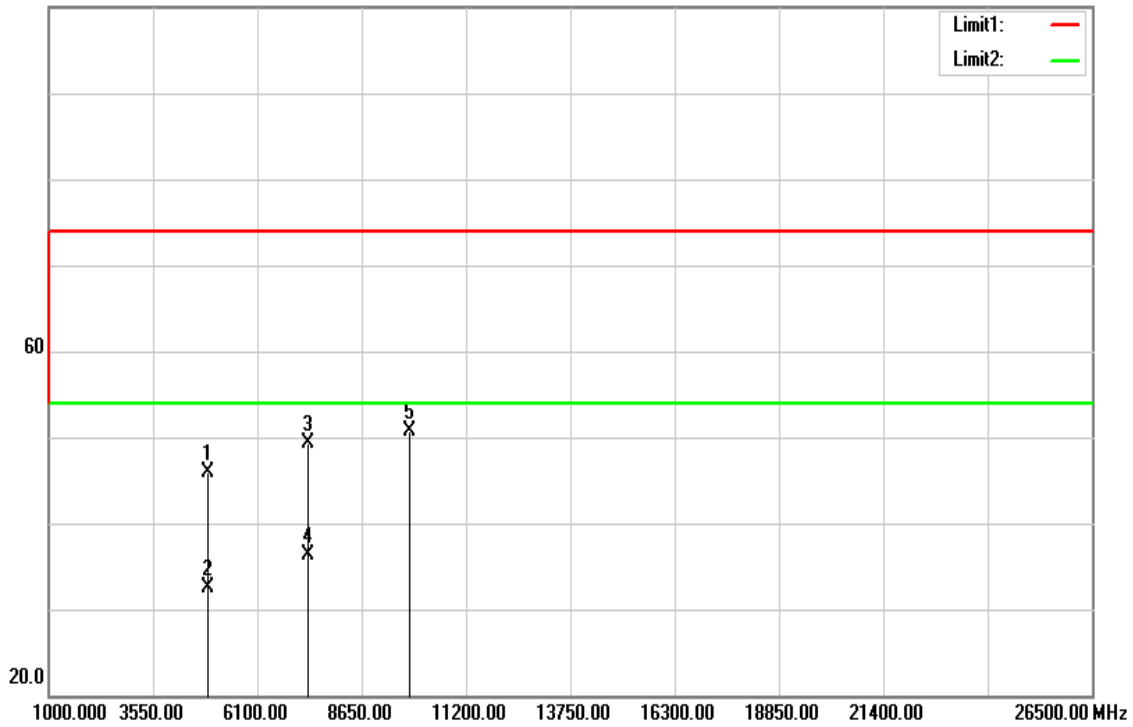
Polarity: Vertical

100.0 dBuV/m



Polarity: Horizontal

100.0 dBuV/m



Operation Mode: TX / IEEE 802.11n HT 40 MHz mode / CH High **Test Date:** September 15, 2016
Temperature: 27°C **Tested by:** Dennis Li
Humidity: 53% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
4904.000	39.19	5.31	44.50	74.00	-29.50	peak	V
4904.000	26.35	5.31	31.66	54.00	-22.34	AVG	V
7356.000	37.33	13.08	50.41	74.00	-23.59	peak	V
7356.000	23.09	13.08	36.17	54.00	-17.83	AVG	V
9808.000	32.07	17.60	49.67	74.00	-24.33	peak	V
N/A							
4904.000	40.67	5.31	45.98	74.00	-28.02	peak	H
4904.000	27.24	5.31	32.55	54.00	-21.45	AVG	H
7356.000	36.14	13.08	49.22	74.00	-24.78	peak	H
7356.000	23.16	13.08	36.24	54.00	-17.76	AVG	H
9808.000	33.15	17.60	50.75	74.00	-23.25	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a) & RSS-Gen §8.8, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

Test Data

Operation Mode: Normal Link **Test Date:** September 26, 2016
Temperature: 24°C **Tested by:** Zeus Chen
Humidity: 50% RH

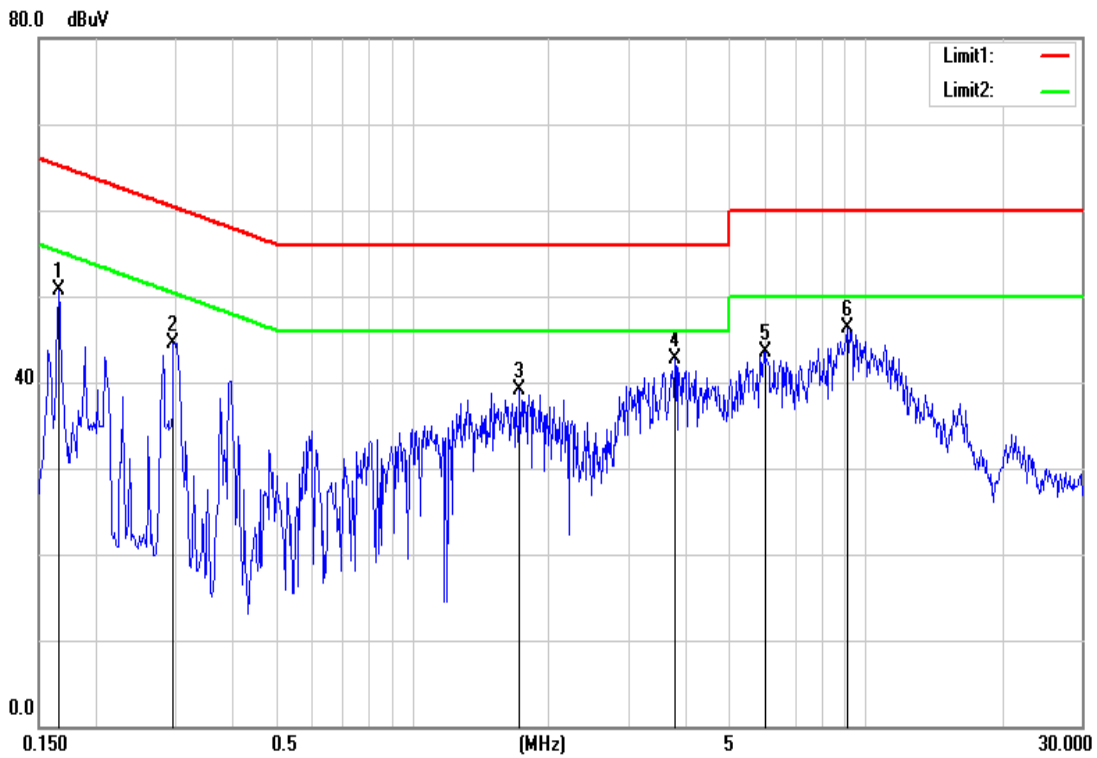
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1660	41.08	39.51	9.69	50.77	49.20	65.15	55.16	-14.38	-5.96	L1
0.2980	34.85	32.58	9.68	44.53	42.26	60.30	50.30	-15.77	-8.04	L1
1.7340	29.09	27.55	9.96	39.05	37.51	56.00	46.00	-16.95	-8.49	L1
3.8140	32.88	30.28	9.82	42.70	40.10	56.00	46.00	-13.30	-5.90	L1
6.0140	33.71	30.78	9.86	43.57	40.64	60.00	50.00	-16.43	-9.36	L1
9.1340	36.41	34.53	9.92	46.33	44.45	60.00	50.00	-13.67	-5.55	L1
0.1700	40.98	38.48	9.64	50.62	48.12	64.96	54.96	-14.34	-6.84	L2
0.1900	39.24	37.88	9.64	48.88	47.52	64.03	54.04	-15.15	-6.48	L2
0.2980	36.91	34.87	9.64	46.55	44.51	60.30	50.30	-13.75	-5.79	L2
1.7780	29.02	27.44	9.89	38.91	37.33	56.00	46.00	-17.09	-8.67	L2
8.9020	35.95	33.74	9.89	45.84	43.63	60.00	50.00	-14.16	-6.37	L2
9.6500	35.69	33.94	9.91	45.60	43.85	60.00	50.00	-14.40	-6.15	L2

Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9 kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

